



VOLUME XLIII
No. 4

July 26, 1917

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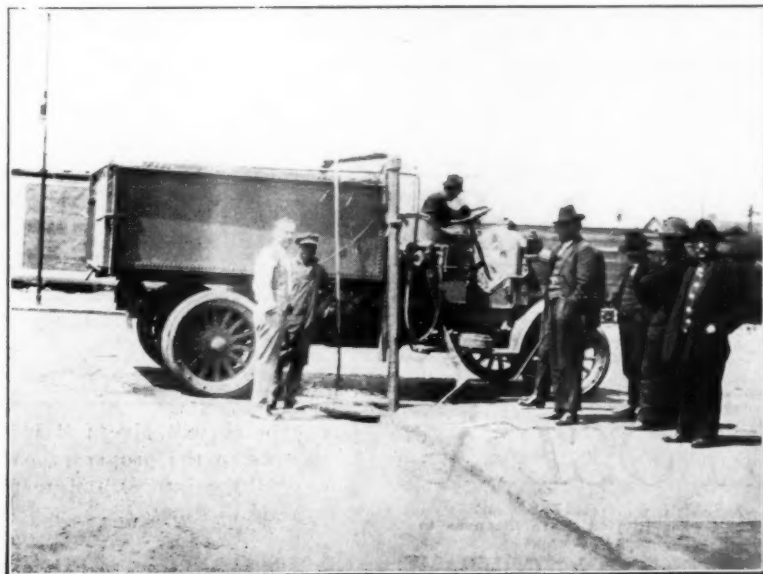
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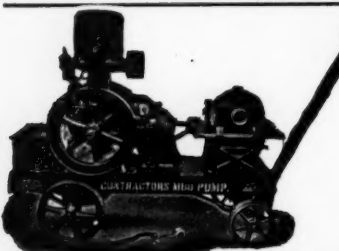
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Municipal Journal

Volume XLIII

NEW YORK, JULY 26, 1917

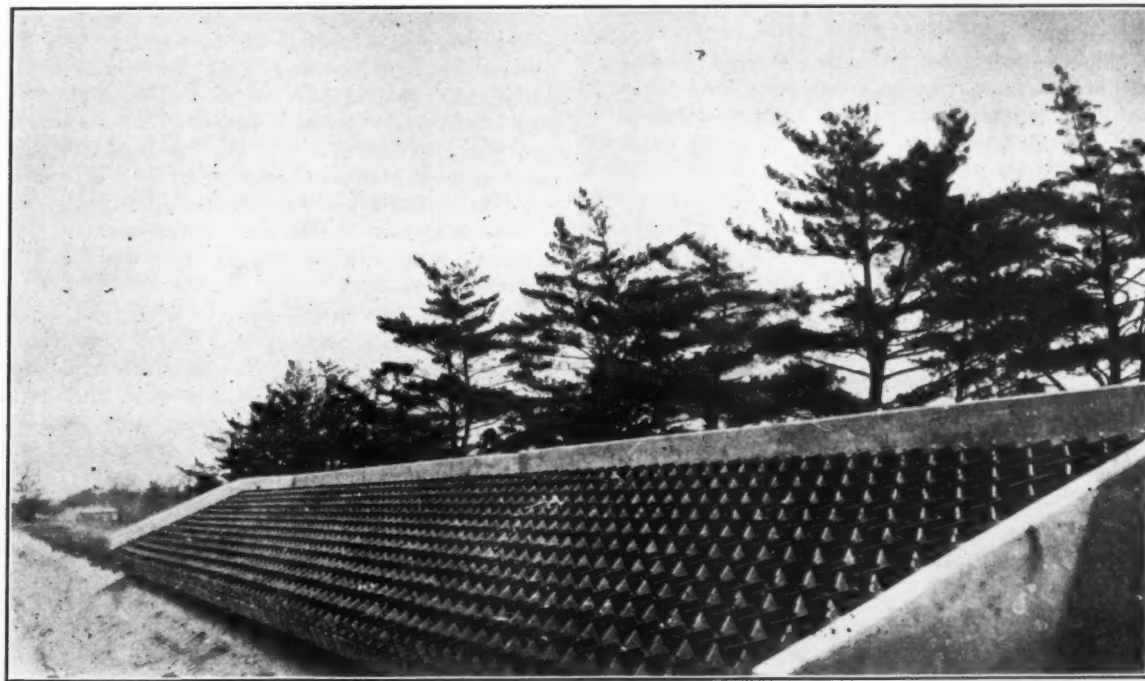
No. 4

THE NEW BRUNSWICK FILTRATION PLANT

Rapid Sand, With Capacity of Six Million Gallons a Day—Water Passes Over a Large Aerator Before Treatment—Wheeler Type of Strainer Bottom Used—New Pumps and Standpipe.

Work is now practically completed on the new filtration plant being constructed for New Brunswick, N. J., and it is expected that operation will begin in less than a month. The plant, which is the outgrowth of agitation extending over the past seven years for purification of the water supply, is of the rapid sand type and has a present capacity of 6,000,000 gallons per day, with provision for an increase to 8,000,000 gallons. In connection with the plant, a steel standpipe 85 feet high and holding 800,000 gallons was constructed for storage and pressure purposes.

10,000,000 gallons. A stone dam forms the impounding basin, from which three 30-inch pipes lead at different elevations to a screened suction well close to the pumping station. A short canal connects the impounding basin with the wheel pit, furnishing water for driving a water power pump. Three 20-inch cast iron suction mains, one to each pumping unit, are connected to the suction well. There are two Worthington pumps of 4,000,000 and 3,000,000 gallons respectively, and a Barr unit of 6,000,000 gallons capacity which does most of the pumping. Water is forced through two 20-inch cast iron lines 8,500 feet



AERATOR, NEW BRUNSWICK FILTRATION PLANT.

The city draws its water supply from Lawrence Brook at a point about one and two-thirds miles from the city. Above the intake, the brook has a drainage area of approximately 45 square miles, including much swamp area, which may account for a noticeable color in the water. The total storage, including mill ponds, is about 227,000,000 gallons, the available storage about 80% of this, and the daily yield in a dry year from 7,000,000 to

to the reservoir, which is located on the top of the highest available hill. The reservoir was constructed originally in two basins with earth embankments, the inner slopes surfaced with clay and lined with stone laid in cement. Each half had a capacity of approximately 7,500,000 gallons, while the daily consumption is about 4,000,000 gallons.

Plans for the improvement provided for draining and

utilizing the west basin of the reservoir for the site of the filtration plant. The head house is a 3-story structure of reinforced concrete and brick, 63 feet 4 inches by 36 feet. On the first floor is the pump room and on the second the offices and laboratory as well as toilet facilities for the men, while the third floor is given over to space for chemical storage. The filter house in the rear is 30 feet wide and 62 feet long. Provision is made for eight filtering units, each 14 feet 6 inches by 24 feet, but for the present only 6 units will be operated. Each unit is designed to filter 1,000,000 gallons per 24 hours.

Except for the changes in the intake chamber of the reservoir, whereby the water level in the chamber has been raised, and the provision for aerating the water, no changes have been made in the general system. The change made in the intake chamber provides that the water in it shall stand several feet higher than that in the reservoir and be discharged over the aerator. The spillway of the aerator is 70 feet long and the crest is $7\frac{1}{2}$ feet wide with a slope of about 22 degrees. The water flowing over this spillway is broken up by fins or baffles of cast iron. These are about 6 inches long, 4 inches high and $\frac{1}{2}$ inch thick and are set perpendicular to each other and at an angle of 45 degrees with the direction of flow of water. They are shown clearly in the illustration.

The water from the reservoir is taken through a 30-inch cast iron pipe to the influent chamber of the sedimentation basins, where it is dosed with alum and soda and passed into the two basins. These are each 31 feet wide and 100 feet long, with a depth of 17 feet. The capacity is 750,000 gallons, allowing a period of sedimentation of slightly over 4 hours at a rate of consumption of 4,000,000 gallons per day. Provision is made so that either basin may be cut out of service for a time, as for cleaning or repair.

Flumes, superimposed, lead the water from the sedimentation basins into a concrete influent flume located under the floor of the filter gallery. Simplex controllers located on operating stands at each basin control the rate of flow of the water onto the filters.

There are eight filter units, arranged four on each side of the filter gallery. Each of the units will be 14 feet 6 inches wide and 24 feet long and will have a capacity of 1,000,000 gallons per day. In most respects they are standard filters of the New York Continental Jewell Filtration Co., but the Wheeler type of strainer bottom is used, a type of construction employed in only six other plants—Akron, O.; Concord, Mass.; Belfast, Me.; Wilson, N. C.; Columbia, S. C.; and Chester, Pa. (now under construction). This strainer bottom is of the "hopper" construction and consists of inverted pyramidal depressions, the base of the pyramid being about

$8\frac{3}{4}$ inches square and the angle between the sides being slightly over 70 degrees. Between the depressions are strips about $3\frac{1}{4}$ inches wide on the sides parallel to the filter gallery and $3\frac{11}{16}$ inches wide on the other sides, giving practically one depression per square foot or 336 for the 14-ft. 6-inch by 24-ft. unit. In each depression is placed five 3-inch balls, one in the apex and one in each angle between the sides. Above these are placed nine $1\frac{1}{4}$ -inch marbles. (See Municipal Journal for May 27, 1915.) The object of this construction is to distribute the wash water over the entire area of the filter, permitting an upward velocity of such water of about 2 feet per minute without "blowing holes" in the gravel and allowing sand to settle down in these holes and later escape with the filtered water. The use of this type of bottom does away with the necessity of using air under pressure for cleaning the filters. Water from the standpipe will be used for this purpose.

The building of the bottoms is the most difficult part of the construction and great care is necessary. Each unit of the bottom occupies practically one square foot and the form for the depression is a machined iron casting, having a $\frac{3}{4}$ -inch hole through the axis, through which a rod is passed. On this rod is strung a brass thimble—the only metal, excluding the reinforcing, to be left in the concrete—placed in contact with the apex of the pyramid above and, below, with a machined cast iron mandrel, into which the rod is screwed by means of a threaded top at the proper place (at $12\frac{7}{16}$ -inch intervals) in the mandrel. This mandrel is tapering, about 4 inches in diameter at the larger end, and is used as the interior form for the water passage from the bottoms of the hoppers to the center channel of the filter unit. This is shown in the line cut.

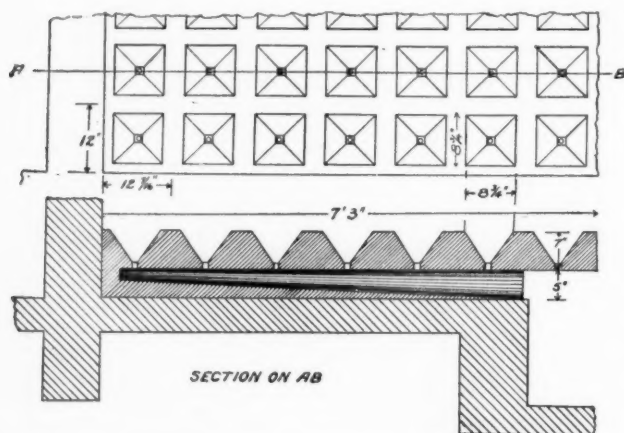
In the construction of the new Brunswick plant, three of the inverted pyramids are fastened at $12\frac{7}{16}$ -inch intervals of one mandrel, and 24 mandrels (with the pyramids) are laid parallel to and 12 inches from each other. Concrete is then poured, 72 units being cast at one time. After allowing the concrete (which is carefully mixed in the proportion of 1:2:4) some time to set, the pyramidal forms are raised slightly, then grout is poured in and the forms are set back in place. This process fills all bubbles and air holes and leaves a smooth and perfect surface.

After casting a triple row, as described, on each side of the filter unit, shorter and larger mandrels are used and double rows are cast alongside the triple rows. This leaves a center row, 2 hoppers wide and 24 long, extending the full length of the filter unit. A bottom form is necessary in casting over the drainage channel and a steel plate 3 feet long and 2 feet wide replaces the mandrels. When all but six of the bottom units have been cast, the large plate is replaced by a plate 2 feet by 1 foot and two more double sections are cast. The last section, 2 feet by 1 foot, is closed by a block cast outside and grouted into place.

Before putting in place, all forms are well oiled and after use are carefully cleaned.

On top of the balls and marbles, already described, is placed the filter medium. A thin layer of 1-inch gravel is spread immediately over the hoppers; over this 9 inches of carefully graded gravel ranging in size from $\frac{1}{8}$ to $\frac{7}{8}$ -inch. Over all is 27 inches of sand.

From the filters, the water passes into the clear water basin underneath the filter gallery, thence through a Venturi tube, which controls the proportional feed device of the chlorine gas, into the clear water basin proper. Good arrangement of baffles practically eliminates dead water and insures a good mix of chlorine gas with water during the 250 feet of travel.



PLAN AND SECTION OF WHEELER STRAINER BOTTOM.

Three electrical pumps force the water from an intake well just off the clear water basin to the standpipe. Two of the pumps have a capacity of 6,000,000 gallons each and the other is half as large. All three are manufactured by the Kingsford Foundry and Machine Co., Oswego, N. Y., and are equipped with general electric motors.

The standpipe is constructed in close proximity to the filter plant. It is of steel, 40 feet in diameter and 85 feet high, with a capacity of 800,000 gallons.

Plans for the plant were made by Asher Atkinson, city engineer, and the New York Continental Jewell Filtration Co., engineers and designers of the filtering apparatus. The Hughes-Foulkrod Co., of Philadelphia, erected the concrete work and the superstructure. The plans for the standpipe also were made by Mr. Atkinson and the actual construction work was done by the Chicago Bridge and Iron Works. A. N. Whitlock is resident engineer at the plant for the Jewell Co.

MILITARY SANITATION IN THE WAR

Methods and Appliances Used by English and French— Disposing of Refuse—Burying the Dead— Providing Drinking Water.

In the June issue of the American Journal of Public Health, Thorndike Saville, assistant in municipal administration at Harvard University, presents an abstract of the only two volumes dealing with military sanitation which have been published describing the methods of the present war in France. One of these is an English book, entitled "Sanitation in War" and the other is a French one entitled "La Pratique de l'Hygiene en Campagne." Mr. Saville states that neither of the books is published in the United States, although the English one is handled by Blakiston, of Philadelphia, and that no translation of the French work has yet appeared. In giving abstracts from these works, he has omitted those portions which concern medical rather than sanitary practice and also those which were common practice in the past and which are known to American sanitarians. This abstract occupies 20 pages of the American Journal and we are presenting below only the more essential features and those which seem most likely to be interesting to sanitarians generally. A number of the methods and appliances are similar to those described in Municipal Journal of June 14th and 28th, and these will not be repeated:

Disposal of Refuse. The disposal of the organic filth and refuse from kitchens and slaughtering places is best accomplished temporarily by quicklime, according to the French author. Indeed, quicklime seems to be used by the French for a considerable variety of sanitary ills, and they use it to a much greater extent than do either the British or Americans. Stable refuse is carefully carted at least a kilometer distant and in a direction opposed to the prevailing winds, where it is dumped on fields. Surface drains should be among the first permanencies of any camp.

Whitewash. The use of whitewash is apparently very extensive in the French army. Not only are all temporary outposts, stables, barracks, etc., kept whitewashed, but elaborate methods have been devised for the preparation of screened partitions for field hospitals or barracks, which consist essentially of a linen cloth fastened

on a wooden frame work and whitewashed. A sanitary and translucent (but not transparent) partition is thus obtained. The whitewash is most successfully applied when there is added to it 1 to 2 grains of olum per liter, as this facilitates adhesion. White washed linen mounted on frame work serves many uses under front-line conditions, as for barriers, screens for officers' quarters and privates, for foundations of barricades, litters, etc.

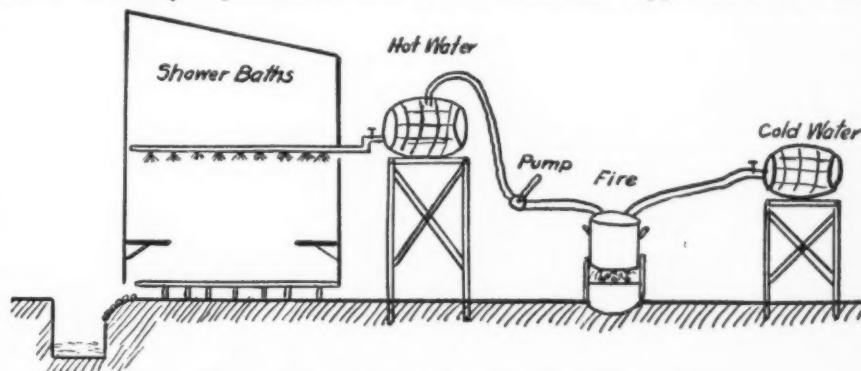
Burying the Dead. One of the most difficult problems is the disposal by burial of the enormous numbers of dead on the field of battle. The French have promulgated the following rules for burial in ground recently evacuated by the enemy.

A convenient site is chosen, as near as possible to where the men have fought. Corpses should not be buried near farms, sanitary structures, roads, rivers, water courses, or in places likely to be flooded. A silicious or calcareous region, dry, permeable, slightly sloping and studded with trees, is the best, if available. Unless specifically disapproved, common graves holding 100 bodies are used. In digging the trench, easy access of air and provision for circulation of ground water should be insured, the object being to promote bacterial growth, and hence rapid decomposition. For the same reason, the use of antiseptics on bodies is ordinarily forbidden. The clothing is removed from the bodies before burial, if possible. Ditches must contain only a single row of corpses and should be about 5 feet deep, 11 feet wide and 100 feet long. The main trench is drained by a small ditch in the bottom about one foot deep and lined with branches, stones, etc. At the highest point of this ditch an opening is left to serve as an outlet for the gases of putrefaction. It is well to cover the corpses first with branches, then with useless clothes, then charcoal, then turf and finally earth, the whole forming a depth of 3 to 5 feet and making a low mound.

Most difficult is the disposal of the dead lying between the enemy's lines and the first trenches, and those in the trenches themselves. Putrefaction of bodies in such locations is not uncommon. So far as possible, these bodies are brought in under cover of night and properly disposed of. Where the burial of bodies becomes impossible or recently interred bodies are uncovered, they are treated at once with an abundance of quicklime or 10% ferric sulphate; or better yet, with a one-twentieth creosol or formalin solution. A chloride of zinc solution followed by ferric sulphate produces antiseptic, mummifying and larvacidal conditions.

Many of the British officers believe that incineration of the dead bodies would be by far the best solution of the problem, but popular feeling prevents this.

Bathing. With the French army, both hot and cold baths are installed wherever the men are in camp for any length of time. Where conditions must be more primitive, small vats or tubs that happen to be at hand



CAMP EQUIPMENT FOR HOT SHOWER BATHS.

may be used. The water is warmed on the cook fire and the men are brought in groups of ten, undressed and scrubbed. In especially unfavorable conditions in cold weather, the bathing may be done in stables where the heat from the animals will maintain a comfortable temperature. For shower baths, a unique arrangement has been devised for use in the vicinity of the trenches, as is shown in Figure 1, consisting of two casks, a can for heating the water, a hand pump, and a pipe provided with sprinkling heads or outlets in a portable bath house. More elaborate arrangements are provided for the permanent encampments. There are also in the service some bath trains fully equipped for sterilizing the clothes, as well as bathing the men.

The French seem to be peculiarly concerned lest the men be not able to shave and obtain a hair-cut, and an indispensable adjunct of the bath is said by the author to be a hair dresser who "will complete the toilet of the men by trimming their hair." This care for the individual comfort of the soldier is a matter of detail to which both French and English officers devote an increasing amount of time and thought.

Insects and Vermin. Both the French and British have taken energetic measures to prevent breeding of flies, the methods commonly employed being destruction by poisons, fly paper, and larvicides, incineration of refuse, fly-proofing of quarters, and protection of foods. Destruction of rats is important in combating bubonic plague, which is carried by the rat flea. The safest poison is phosphorus, made up in 4% tablets, and sulphur dioxide is effective if it can be concentrated and confined. The French also use both a virus which is ingested by the rats with a treated food, and a toxic extract which is said to be efficacious. The French phosphoric paste is made by mixing 750 grams of flour with 750 grams of water and adding 8 grams of white phosphorus; to which mixture is added 150 to 200 grams of cheese paste and 100 grams of powdered sugar.

Typhoid is spread by the body louse or tick, and the following measures for its suppression are in use by the French: (1) Disinfection of cantonments abandoned by the enemy and medical supervision of prisoners for suspected cases. (2) Inspection of premises and of personal effects of the soldiers; installation of stations for disinfecting clothing of vermin; use of shower baths. (3) Careful de-lousing of hair and clothes of suspects by special contrivances; isolation of suspect or patient; enforcing absolute asepsis, by means of special clothing, etc., on all the medical personnel; general sanitary precautions to isolate the buildings containing suspects and patients. Removal of lice from the head is effected by an ointment of equal parts of kerosene and olive oil rubbed on the head and washed off in 24 hours; also benzine, kerosene, or 10 per cent acetic acid alone are effective. Lice in clothing are removed best by certain powders, one of which is 2 per cent iodoform, 2 per cent creosote and 96 per cent naphthaline. The young are destroyed by smearing seams with a grease of mineral oil 9 parts, soft soap 5 parts to water 1 part. Steaming or heat treatment also is efficacious.

Typhoid.—For preventing the spread of typhoid, the soldiers are required to be vaccinated with anti-typhoid. The British use two injections at ten-day intervals, one of 500 million dead bacilli and the second of 1,000 million. The French have found that two injections do not

always protect and use four injections at intervals of 7 to 10 days. Only men in good health are inoculated, and they are given one day off following each injection. If local reaction is excessive, the English give 30 grains of chloride of calcium just before and six hours after the inoculation.

Antiseptics.—For dry antiseptics the French use chloride of lime as a deodorant, ferric sulphate to prevent fermentation and quick lime to destroy organic matter. Formalin solutions are commonly used as body disinfectants in washing, etc.

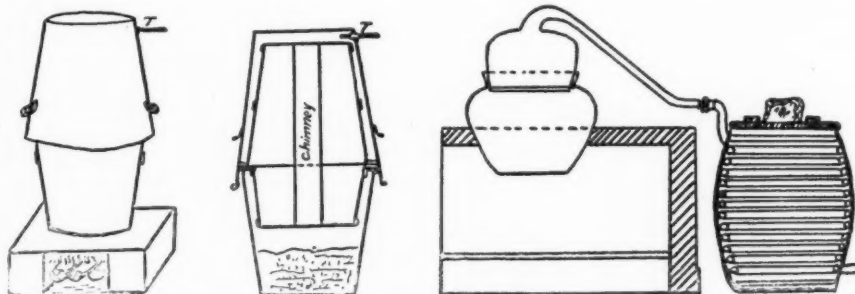
Chloride of lime is prepared by adding little by little 100 grams of chloride of lime to a liter of water, then diluting with water to 100 times the volume. Corrosive sublimate is used one part to 1,000. The addition of two grams of sea salt per liter adds to the efficacy by hindering the coagulation of albumen. Heavy coal tar oils in emulsion with water in proportion of 500 to 100 parts per 1,000 constitute primary deodorants.

Disinfection.—For field disinfection, the French use a portable Thresh steam disinfecter which is capable of sterilizing 60 blankets at 100° C. The standard disinfectant used is liquor cresoli saponatus, having a carbolic coefficient of 12. This forms a stable emulsion and is used in proportion of 1½ ozs. to a gallon of water. Carbolic acid and formalin also are used in proportion of 8 ozs. of either per gallon of water. Disinfection of hospital wards after contagious cases, of ambulances, etc., is effected by the use of formaldehyde and sulphur dioxide in a manner similar to that practiced in the United States.

Two methods of dry disinfection are used which are shown in the accompanying illustration. That at the left consists of two conical parts, one inverted over the other. A closed chimney passes through the center and a thermometer opening is left at the top. Clothing or other things to be sterilized are placed around the chimney and a temperature of 100° C. is attained.

A more elaborate arrangement is that of Dr. Bordas, shown on the right. This consists of a retort filled with water, the steam generated by which passes through spiral lead pipes coiled about the inside of a wooden cask. Material to be sterilized is placed in the inside around a cylindrical log of wood, which is stuck up through the center. When ready for use the log is withdrawn, the cover is made tight and steam turned on. Temperatures of 106° C. to 108° C. are attained.

Water Supply.—As to water, the general rule is to consider all water polluted and to sterilize it. Signs



TWO METHODS OF STERILIZING BY DRY HEAT.

are posted reading either "dangerous water" or "drinking water"; never "rinsing water" or "wash water." Sterilizing is accomplished by hypochlorite of lime or permanganate of potash, although the British do not favor the use of the latter. The French consider water to be potable if within the following limits, the figures being in parts per million; total permanent hardness, 15 to 30; hardness after half hour's boiling, 5 to 12; saline residue after four hours at

110° C, less than 400; chlorides as NaCl, less than 66; chlorides as chlorine, less than 40; sulphate as anhydrous CaSO_4 , from 8 to 50; organic materials (as oxygen consumed by permanganate per million parts alkalinity), 2; nitrates, 0 to 15; nitrites, none; albuminoid ammonia, 0.05 to 0.10; bacteria from 100 to 1,000; B. coli, from 1 to 10 per liter.

The British author stated that bacterial and chemical examinations in the field were unheard of until the present war, but now motor laboratories are provided in which routine examinations may be carried on. These laboratories are not sufficient to meet all needs, and for reconnaissance, portable boxes have been devised containing necessary equipment to determine the total number of organisms and the minimum amount containing necessary factors for 16 samples per day. Eight test tubes are provided for each water, one for agar for the total count, and seven for McConkey's taurocholate-lactose-litmus broth in amounts ranging from 0.5 c. c. to 20 c. c. The box contains also necessary incubators and sterilizers. All accessories and materials for examination of 500 samples are carried in another box. The total weight is a little over 100 pounds, and examination of sixteen waters per day is possible.

It is estimated by the British that the water requirements of the military force are as follows: each man requires per day 20 gallons in barracks, 5 gallons in standing camps when clothing is washed, 3 gallons in camps when no clothing is washed, 1 gallon in bivouacs for drinking and cooking only, 3 pints for drinking only (as a minimum), and 1 gallon during a march of 15 miles a day. For animals, the daily requirements are 10 gallons for a horse or camel, 8 gallons for an ox, 6 for a mule, 5 for a donkey and 2 for a sheep or pig.

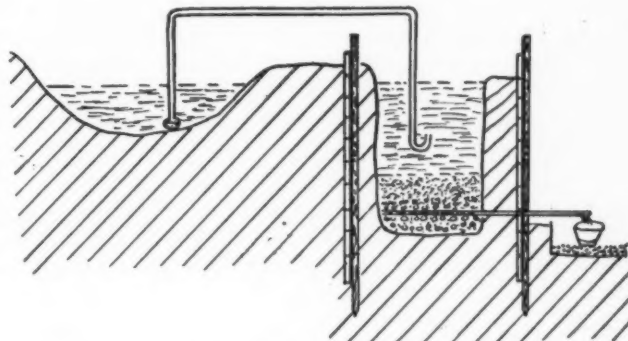
It is suggested that the most likely place for water in hilly districts is the base of the steeper side of a deep valley, just below where the valley bifurcates. The most likely situations in a plain are the lowest depressions and points where vegetation shows the greenest, or where the morning mist hangs longest, or the midges are most numerous. The English volume referred to contains a brief description of the geological formations of northeastern France and Belgium in relation to water supply, which should be of great importance to troops in that district.

For purifying water, the simplest and most efficacious method is by boiling, and this is done in all temporary encampments. It is often best to make the water into weak tea, which is a better thirst quencher and more palatable than boiled water. On the march, the British practice is to boil the water in kettles during the night and fill the water bottles with this water. A second boiling then provides enough for the water carts. In the morning the unit moves with bottles full and carts containing sufficient to refill them, all the water having cooled and being sterile.

The most economical means of heat sterilization is by some apparatus whereby the heat of the outgoing sterilized water is given up to the incoming raw water. An apparatus similar to the Forbes-Waterhouse sterilizer in use in the United States army has been used by the British, but has been found unreliable, since the middle compartment may leak and raw water enter the outgoing stream without detection.

In the United States army, in large encampments of a more or less permanent nature, the Darnoll filter is used. This consists of a series of containers holding in all 20 gallons. There is a siphon action whereby the water is treated with alum and sodium carbonate, one pound to each 500 gallons. Most of the suspended matter and a large percentage of the bacteria are thus precipitated and the water is then filtered through flannel

bags. This apparatus is heavy and cumbersome and only mechanical purification is obtained. Where the ground is at all adapted to filtration, the British have evolved rather elaborate means of collecting water by building a revetment parallel to a side hill contour, siphoning the water into this from a nearby stream, and filtering it. The filtered water may then be delivered under some head. A section of such an arrangement is shown herewith.



SIPHONING AND FILTERING WATER FROM STREAM.

The British also advocate the use of the self-washing filter cone, such as is used at Toronto. Theoretically, this is most economical, but no results from its use in the army are given, and it has not been satisfactory at Toronto. The British and French both use filter candles of porcelain or prepared material, but their use is limited and the results are not altogether satisfactory.

Sterilization by means of chemicals has, after all, been found to be the most satisfactory method, and of all of the possible chemicals that have been used, bleaching powder has been found the most desirable and has been most used. To insure adequate sterilization by bleaching powder or hypochlorite, there should be one part of available chlorine per million parts of water. To allow for probable deterioration of commercial bleaching powder, a safe amount to use is 2 grams per 100 gallons (this being the capacity of the British water cart). The standard practice is to use 8.25 pounds per million gallons.

The English commonly use alum for clarification and hypochlorite for subsequent sterilization. To provide a simple, light and efficient apparatus for water purification and one easily erected, the Lister bag has been devised by the United States army. This is a heavy canvas bag supported on a tripod. Five spigots are set in the bottom with their ends projected about three inches above the bottom of the bag. Five soldiers at a time can use this bag. The bag is suspended and filled with water which should be clear. To the water is added in the form of a paste one grain of calcium hypochlorite, which comes in glass tubes containing 1 gram each. The bag holds 40 gallons of water. The disadvantage of the bag is that, while it sterilizes, it does not clarify.

Sodium bisulphate is considered by the British a most useful means of sterilizing water by use of a single tablet, and is especially valuable for troops, such as cavalry, which occasionally find themselves detached from their water carts. Each man carries a bottle of tablets and when refilling his water bottle, adds a couple of tablets and does not drink for a half hour. Adding 2 grams of the salt to the contents of an English water bottle gives 0.7 per cent free H_2SO_4 , which destroys bacteria in half an hour. The tablets are made up with oil of lemon and saccharin, so that the solution tastes like lemonade. The objection is the liability to forma-

tion of soluble sulphate of toxic metals from the water bottles, nearly all alloys and metals being attacked. Aluminum water bottles should be supplied to men using these tablets, as the alum sulphate formed is so slight as to be of no consequence.

EMERGENCY ROAD CONSTRUCTION IN PENNSYLVANIA

Trying to Make a Record of Two Miles of Complete Construction a Week to Serve the Military Camp at Mt. Gretna.

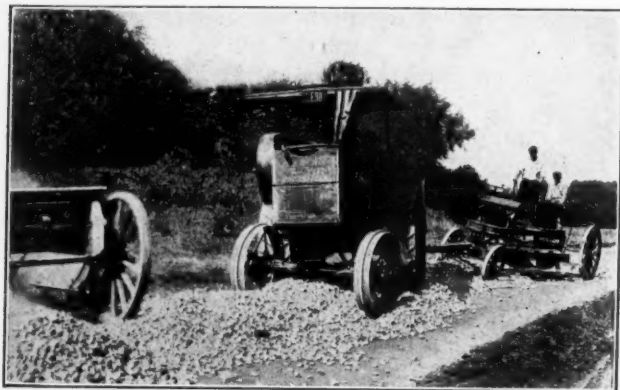
In connection with the construction of the Mt. Gretna, Pa., camp, to be used in mobilizing cavalry, artillery and heavy supply trains by the military authorities, the State Highway Department of Pennsylvania was asked to provide 6½ miles of macadam road leading to the camp in the shortest possible time. State highway commissioner Frank B. Black, chief engineer W. D. Uhler and second deputy commissioner George H. Biles laid out a schedule that called for completing two miles of water-bound macadam road, 16 feet wide, each week until the road was completed, work to begin on July 1st. The work



"BRUSHING" THE RIGHT-OF-WAY, MT. GRETNA, PA.



ROOTER PLOW HAULED BY TRACTION ENGINE PREPARING SITE FOR OPERATION OF ROAD GRADER.



SPREADING SURFACE STONE WITH ROAD GRADER AND TRACTION ENGINE.

was carried along expeditiously, and at the end of the first week was ahead of schedule, when five days of almost continuous rain transformed the graded roads into seas of mud, and greatly delayed the construction. At the time of writing there are 300 laborers living under tents erected according to the military regulations, and fed by the National Guard Commissary Department. The State Highway Department equipment on the ground includes 12 traction engines, 10 rollers, 13 scrapers, 31 dump wagons, 22 auto trucks, 7 rooter plows, 9 sprinklers, 1 scarifier, 4 harrows, 4 drag scoops and 1 gasoline pump. Twenty car loads of material are arriving at the scene of the work each day, and all of the equipment is kept busy distributing it to the proper points.

The road is built in two layers, the base being composed of slag. At the commencement of operations there was delay in securing the slag in the required quantities, and the State Highway Department practically commandeered a slag pile at Lebanon, and department men were put to work loading cars. Efforts to blast the crust of the slag with dynamite were not successful, as the dynamite spread its force through the loose slag under the crust, and the department put in a well-drilling outfit and, after drilling holes through the hardened crust and the loosened slag, used black powder in them, which successfully broke up the mass.

Secondly Deputy Commissioner George H. Biles is in charge of the work, and describes the methods used as follows:

"The work embodies principally the complete opening up of a new right-of-way, which requires that various operations must be carried on in order, namely, the section first must be brushed, trees removed, and stumps and rocks blasted out before the actual grading work can be taken up. Upon some of the sections this work is of magnitude, and requires a large organization to accomplish satisfactory results. When the right-of-way has been thus cleared, traction engines, with rooter plows, are started in to completely loosen up the surface. This is followed by traction engines and road machines, or graders, which complete the removal of the necessary material to the grade lines.

"All craters left by the removal of stumps and large rocks are filled with stone in order to ensure a solid sub-grade. Drains and culverts then are placed at the proper locations, and after this the large power rollers are put in operation, and the surface is thoroughly compacted. Upon the sub-base, after being properly prepared, the slag, which is being used for the base construction, is deposited in the center of the road in continuous stretches. This material is spread in two layers by these machines, which are drawn by traction engines, each layer being thoroughly rolled, and upon completion being about eight inches in depth.

"With the final rolling of the slag base, the surface of the slag is sprinkled, which tends to solidify or cement the material more uniformly. Upon this surface trap rock ballast is deposited in continuous piles along the center of the road, the same as was done with the slag. This also is spread in place with the use of the traction engines and road machines to a depth of about five inches.

"When the proper amount of material is secured, and the spreading is completed, a spiked-tooth harrow, weighing about four hundred pounds, is drawn over the surface of the road, back and forth, which eliminates the possibility of loose pockets. This operation is continued until the teeth of the harrow practically ride on the upper surface of the stone. Stone screenings then are spread lightly from piles at the sides, and this is followed by

sprinkling and rolling alternately, adding the necessary amount of screenings during the operation in order to bond up the ballast stone thoroughly. This course is four inches in depth when compacted. The rolling and sprinkling are continued until a surface mortar is produced, and the road shows no wave under the operation of the roller. When this is completed, the surface then is to be opened to traffic for a few days, and thereafter given an additional rolling and finishing in order to compact uniformly and completely all portions of the surface.

"Upon the finished road surface, after the fine material has been swept off, a bituminous treatment of four-tenths of a gallon to the square yard is to be applied with motor pressure distributor, using Department Class 'C' specification material, and covered with trap rock chips in quantities ranging from fifteen to twenty pounds to the square yard, applied with mechanical spreaders."

EARTHQUAKE BREAKS LOS ANGELES AQUEDUCT.

BY C. W. GEIGER.

A few days ago an earthquake occurred in the Owens Valley region lasting for several seconds, accompanied by a long swaying motion of just the kind that had been anticipated. One hundred and sixty feet of the solid concrete flume that carries the aqueduct waters along the face of the Alabama hills was carried away. The downhill side of the pipe broke away and slid down about six feet. The upper portion of the pipe remained intact.

The question has often been asked by the people of Los Angeles as to what would happen if an earthquake should occur and break the aqueduct. The earthquake occurred, and the break was repaired before the people of Los Angeles knew anything about it. The spot where this trouble occurred has long been watched with anxiety. It is six miles above the Cottonwood power plant, and twenty-six miles above the Haiwee reservoir. The line of the aqueduct is well up on the face of the hills, but above it there has existed for untold years a little spring that sends out its trickling stream. Evidence exists that years ago a previous landslide occurred at this spot, and since then large trees have grown on the earth carried down the hill, and which has been shot well out onto the desert land. For a distance of 500 feet it was necessary to throw up an embankment from ten to twelve feet high when the railroad was built at the base of this hill. The earth for this purpose was taken from a borrow pit at the foot of the hill. This lessened the hill's support. The saturation of the earth above made earthquake action just the thing to cause a slide.

As soon as the quake was felt at the Cottonwood power plant and by the watchman along the line, observations were made, and within a few minutes the watchman in charge of the section where the slide occurred was at the spot. He discovered the break in the pipe, and also saw evidence that a land slide would occur, and the water was shut off at once some distance up the line. Then the water-soaked earth gave way, and a great mass of rock and gravel slid down the hillside, and the lower portion of the pipe settled to a level six feet below its original position.

Within a short time after the slide occurred the chief engineer was on the spot, and within a few hours steel pipe had been put into position along the section disturbed, and water was again turned into the pipes, carrying from 10,000 to 12,000 inches without any further

trouble. The immense storage capacity of the Haiwee reservoir would have been amply sufficient for all purposes for a long period had there been no quick closing of the break.

This section will be reconstructed so that no further trouble need be feared. The pit made by the railroad grade construction will be filled, the material being taken from the top of the hill, above the adqueduct. This will strengthen the hill's support, and at the same time lessen its weight. A buttress of earth will be built below the spring and a subdrainage put in, so that the water may be collected and carried to the bottom by this means. The break is not an expensive one, but the work will be rather long-drawn out, as it is desired that the earth shall have ample time to settle before the permanent work is put in.

OKLAHOMA'S REGULATION OF WATER SUPPLIES AND SEWERAGE

New State Law Requires Approval of Water and Sewerage Plans by State Board of Health—Preventing River Pollution.

The state of Oklahoma this spring enacted a law for the protection of the public water supplies and regulation of sewerage which is in line with the most advanced requirements of other states in this respect. The general provisions of the act are given below.

No private party or municipality is permitted to supply water for domestic purposes, or let a contract for doing so, by means of works constructed in whole or in part or extended subsequent to the passage of the act, without a written permit from the State Board of Health. In applying for this permit they shall submit to the board maps, plans and specifications, and a description of the source from which the supply is to be derived, method of storage, purification, etc. Nor shall a new source of supply be added in any case without special permission. If the state board believes the proposed supply to be prejudicial to the public health it may refuse a permit; but if the parties consider the refusal to be illegal or unjust or unreasonable, they may, within 30 days, appeal to the district court, which court is required to render a decision without delay, either approving, setting aside or modifying the order, or fixing the terms upon which the permit shall be granted.

Supplying water contrary to the above provisions is a misdemeanor punishable by a fine of not less than \$25 nor more than \$50 for each day that the offense is continued. Letting a contract or contracts for any construction work, or doing any construction work covered by the above provisions without a permit, is punishable by not less than \$500.

If anyone complains against the sanitary quality of any public water supply or the State Board of Health believes that such supply may be prejudicial to the public health, it shall investigate it, in which case every private or municipal party connected with the supply is required to furnish all the necessary information, and the state board may order such change in the source of supply or the manner of storage or purification as it thinks necessary. Such order may be appealed from to the district court as provided above.

In connection with sewerage, no private parties or municipality shall contract for construction work of any nature for a sanitary sewerage system or sewage disposal plant, or for any extensions of either, or permit any sewage to be discharged into any water of the state, without a written permit from the state board. The act, however, does not prevent the discharge of sewage from

a system which was in operation and discharging sewage on the first day of July, 1915; except that if the state board shall find that such system is polluting any of the waters of the state in a manner prejudicial to the health of its inhabitants, it may require the pollution to cease within a reasonable time, or require such treatment or disposition of the sewage as may be necessary to prevent further pollution. If any system is prohibited by the above provisions from discharging sewage, the state board, if it is its unanimous opinion that the general interests of the public health would be subserved thereby, may issue a permit for the discharge of sewage from that system into any water of the state; stipulating conditions under which the discharge may be permitted, if they think best. Such permit is revocable or is subject to modification and change by the state board after an investigation and hearing. An order to discontinue the discharge of sewage from an existing plant shall take effect after a stated length of time, but this must be at least one year and not more than two years.

For the purpose of carrying out the provisions of this act, the state engineer is to designate one of his assistant engineers for the State Board of Health, which engineer is to examine all applications, maps, plans, specifications, etc., and in general serve as engineer to the State Board of Health. (This method of providing the engineer for the state board is probably because it is assumed that the engineering work of the board will not require the entire time of one engineer.)

Suits under this act are to be brought in the name of the state by the attorney-general, and any fines recovered are to be paid into the school fund of the state. The act does not go into effect until September 30, 1918.

TAKING STOCK OF ROAD MATERIALS.

A few weeks ago Municipal Journal discussed the advantages which would accrue to the highway departments of states, counties and municipalities should the state or other governmental unit make an examination of all deposits within the state of materials suitable for road construction, determining the characteristics of each, the facilities offered for transporting the material to any section of the state, etc. We learn that such a stock taking of road materials for the entire Atlantic and Gulf Coast regions is now under way, with Dr. William Bullock Clark, the state geologist of Maryland, in general charge of the geological work, and Henry G. Shirley, chief engineer of the State Roads Commission of Maryland, in charge of the engineering work. The work is being done as a part of that carried on by the National Research Council, which was organized by the National Academy of Sciences, at the request of President Wilson, to assist the Council of National Defense.

The committee which is investigating road materials is known as the Committee on Available Materials for Rapid Railroad, Highway and Fortification Construction Behind the Front. In the investigation this committee is being assisted by the geologists of the different states and by the different state highway departments. While primarily the information is being collected as a war measure, it will undoubtedly be accessible to the state and local highway departments of all the states embraced

in the survey, and will thus be of very great value to road work in the entire eastern part of the country. State committees, comprising the state highway commissioner or highway engineer of each state, together with a geologist connected with the state government or state university, have been formed in each of the states of Alabama, Connecticut, Delaware, Florida, Georgia, Louisiana, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, South Carolina, Texas and Virginia.

A. S. M. I. DURING THE WAR.

As was stated a few weeks ago, the executive committee of the American Society of Municipal Improvements, after consulting with the members in New Orleans (where it had been proposed to hold the annual convention this fall) and carefully considering various conditions, voted to postpone for a year the convention of this society, the 1918 convention to be held in New Orleans, the date to be selected by the committee later. At a meeting of the committee held a few days ago further consideration was given to the matter, and it was decided to substitute for the reading and discussion of papers at the convention the issuing of three quarterly publications to appear in October, January and April. In these will be published reports of committees (excepting such reports as may require adoption or other action by the society), and also papers which would have been presented at the convention had this been held. Members are requested to send in written discussions on the papers appearing in the October issue, to appear in that for January, and of those in the January issue to appear in that of April. Discussion of the papers in the April issue (and presumably further discussion of those appearing earlier also) will be asked for at the convention to be held in the fall.

This publishing of the papers will, it is hoped, satisfactorily take the place of the reading and discussion of the papers at the convention, and thus assist in maintaining the interest of the members in their society. One of the great advantages of the convention is, of course, the personal contact and intercommunication of ideas and the inspiration derived therefrom, and this the society will necessarily be deprived of this year; but it seems probable that the technical advantages derived by the members will be met even more satisfactorily, in some respects, by the publication of these several groups of papers than by the presentation of them in convention, where there frequently is not time for their adequate presentation and full discussion. For its members who would not have been able to attend the convention, it is believed that the service rendered will be much more acceptable than the publication of the papers and discussions several months after the convention, as would be the ordinary procedure.

COST OF OPERATING MOTOR VEHICLES

The annual report of the Commissioner of Streets and Bridges of Houston, Tex., for 1916, gives the cost of operation of motor equipment used in his department as follows:

	Repairs and supplies	Tires and supplies	Gasoline	Grease	Oil	Totals	Mileage	Cost per mile	Chauffeur cost	Total cost per mile
Com.'s Car No. 7063.	\$347.92	\$179.05	\$167.27	\$4.50	\$37.37	\$736.11	10,260	\$0.07	\$0.07
Supt.'s Car No. 4489.	164.95	87.20	194.78	3.35	31.60	481.88	15,630	.0303
Truck No. 4936....	906.70	178.41	622.35	135.81	3.90	1,847.17	14,180	.13	\$2,160	.28
Truck No. 4437....	762.61	118.94	673.83	130.45	3.90	1,689.73	14,575	.11½	2,160	.26½
Motor Sprinkler and Flusher	774.49	381.12	706.99	92.00	3.90	1,958.50	11,371	.17¼	2,160	.36¼

Municipal Journal

Published Weekly at
243 West 39th Street
by
Municipal Journal and Engineer, Inc.

S. W. HUME, President
J. T. MORRIS, Treas. and Mgr. A. PRESCOTT FOLWELL, Sec'y

A. PRESCOTT FOLWELL, Editor
W. A. HARDENBERGH and SIMON BARR, Assistant Editors

Telephone, 9591 Bryant, New York
Western Office, Monadnock Block, Chicago

Subscription Rates.

United States and possessions, Mexico and Cuba.....\$3.00 per year
All other countries..... 4.00 per year
Entered as second-class matter, January 3, 1906, at the Post Office at
New York, N. Y., under the Act of Congress of March 3, 1879.

Change of Address.

Subscribers are requested to notify us of changes of address, giving
both old and new addresses.

Contributed Articles and Reports.

*Contributions suitable for this paper, either in the form of special
articles or as letters discussing municipal matters, are invited and
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MAKING THE BEST OF NECESSITY.

Sometimes instead of going to considerable expense to prevent a certain occurrence, it may be better to invite or at least permit it and take precautions to control it—perhaps even to use it to advantage.

An illustration of this is the so-called "low-water bridge" used in the southwest. Instead of making a long bridge with numerous high arches to pass the great floods of the "flashy" streams that sweep through wide, flat valleys, engineers in that section build a low bridge with one or two arches that will carry the ordinary volume of flow; then when the flood comes it sweeps over the top of the bridge and its approaches, which are prepared for such occurrence. The bridge is out of service for a day or two, it is true; but one that would pass the entire flood through its arches or spans would be prohibitive in cost.

Another instance of making the best of the inevitable is offered by a roadway which a city engineer constructed to serve as a stream channel during infrequent floods of a small mountain brook. Instead of providing a large and expensive storm sewer to carry these occasional floods down a side street that ran up into a notch in the hills, he built a small sewer to carry the ordinary run-off; then built the roadway dished in the middle with high integral curbs, and carried it to a stream that passed near its lower end. This roadway carries the heaviest floods without damage to any property, and cost little if any more than one of standard construction.

These two solutions of difficult problems can probably be applied successfully to similar conditions elsewhere. But the most useful application is that of the general idea: Unusual conditions can frequently be met best by unusual

methods. It is sometimes advisable to drop standard methods entirely and strike out along original lines. This requires more skill and engineering knowledge to make sure that the new ideas are practicable and will not cause unexpected and undesirable consequences; but the engineer should welcome such tests of his ability.

SANITATION OF HEALTH RESORTS.

At this period of the year occurs what is sometimes referred to as a "summer typhoid" epidemic, the cases of typhoid in a number of the large cities showing a considerable increase at this season. There are probably several causes for this, but perhaps the most important one is the unsafe water supplied at the health resorts visited by large numbers of city dwellers. This condition has produced serious results in the past, but it seems probable that the change in summer habits which has been brought about by the more general use of the automobile will make it one of increasing danger. When it was the practice for most vacationists to spend their one or two weeks at a single resort, dangerous water at one of these would affect only the few who spent their summers there. But a large and increasing number using the automobile make stops of only a night or two at any one place, and thus increase five or ten-fold the probability of their imbibing water from one of these impure supplies.

Under either condition, it would seem that every State Board of Health should recognize it as its imperative duty to insure as far as possible the safety of water supplies in all hotels and boarding houses used by the public in their summer outings. This, of course, means an immense amount of work, as the takers of "summer boarders" are numbered by the thousands in many states; but by continuing the examinations throughout a large portion of the year, it should be practicable to examine at least all of those upon the main highways. A suggestion in this connection is the automobile laboratory used by the State Board of Health of New Jersey, and described in Municipal Journal for May 24th, by which the entire state could be covered.

OUR WESTERN EDITORIAL REPRESENTATIVE.

Municipal Journal has added to its editorial staff, as western editorial representative, Charles Carroll Brown, for about twenty years editor of "Municipal Engineering." Mr. Brown has sold all his interest in the latter periodical and severed all connection with it, and will assist in keeping Municipal Journal the leading municipal periodical.

THE CATERPILLAR IN ROAD CONSTRUCTION.

The State Highway Department of Pennsylvania was trying to rush through a new highway in a clay country for military purposes. It had cleared the right of way and graded several miles, and constructed part of it, when a five days' rain fell on the clay sub-grade. The result was a practical halting of the placing and rolling of macadam, since the teams cut the clay into a mire.

This experience suggests a method by which it would seem to be possible to continue work under such conditions. This is the use of the "caterpillar" type of vehicle for hauling material onto the sub-grade. If the clay is surfaced so that it will not hold water in puddles, as soon as the stone is placed it should be possible to level and roll it without any difficulty. The same plan should also, it would seem, work to advantage on a dry sandy road, which material also is cut all out of surface by the passing of a few wagons. The caterpillar tractor has given good service in the west, and there is no question concerning its practicability.

The WEEK'S NEWS

State Road Progress in Texas and Nebraska—New York City to Pay for Sidewalks—Baltimore to Improve Health and Housing—Reducing Child Mortality in Newark—Increased Gas Rates in Massachusetts Cities—To Study New York City's Traffic—Seattle's Municipal Railroad—Municipal Aid in Massachusetts Food Problems—Ohio Flood Protection Litigation Ended—Yonkers Wins Its Smoke Abatement Fight—Recreation in Cities in United States—Spokane Committees Study Food Questions.

ROADS AND PAVEMENTS

Court Upholds Texas Road Law.

Austin, Tex.—The constitutionality of the law creating the state highway commission has been upheld by Judge George Calhoun in the Fifty-third district court in an opinion rendered in the injunction case of P. S. Atkins against Curtis Hancock, chairman, and other members of the state highway commission. Judge Calhoun refused to grant an injunction to plaintiff to restrain the collection of the license tax. The court held that in passing this law the legislature acted within its legislative powers and there is nothing in the act repugnant to the constitution; that it is one of the functions of the government to establish and maintain public roads, "and that over said roads the state by and through the legislature has absolute control," and may rightfully prescribe uniform regulations necessary for public safety and also charge a graduated fee for the registration of motor vehicles. The court held also that the legislature was acting within the police power of the state in the enactment of the law. Continuing in the opinion the court says: "And it further appearing to the court that the acts attacked herein by the plaintiff as being unconstitutional are not violative of the constitution of the state of Texas but come within the police powers of the state, and that therefore in passing the laws attacked in this suit by the plaintiffs as being unconstitutional the legislature of the state of Texas was acting under the exercise of police power uniformly recognized as belonging to the states and essential to the preservation of life, health, safety and comfort of the citizens of the state of Texas." The plaintiff gave notice of appeal to the third court of civil appeals.

Each County Must Have Highway Commission.

Lincoln, Neb.—Under a new law, passed by the legislature, the board of county commissioners of each county and supervisors are required to designate certain roads in their respective counties as "county roads," which shall be maintained at the expense of the county. The State Board of Irrigation, Highways and Drainage is empowered to consider and decide objections on the part of freeholders to such designations. The county boards are required to appoint county highway commissioners and to establish a complete system of county roads. "The board of county commissioners or supervisors of each county shall, within one month after the taking effect of this act, select and designate from the laid out and platted public roads within the county certain roads to be known as "county roads," which shall be direct highways connecting cities, villages, and market centers, and shall be main traveled roads. These are to be plainly marked on a map, and said map shall be deposited with the county clerk, and open to public inspection." Hearings are to be held. Any ten freeholders of the county may file a petition with the county clerk asking for any change in designated roads, setting forth the reason, accompanied with a plat showing such proposed change. "If no agreement is reached between the county board and the petitioners at said hearing, the county clerk shall forward said map, together with all petitions and plats, if any, to the State Board of Irrigation, Highways and Drainage. If no objections are filed and no hearing had, or if an agreement is reached, the roads so designated on said map shall be conclusively established as such county road. "The decision of the state body will be final. All county roads designated in accordance with the act are to be maintained

at the expense of the county. The boards of county commissioners or supervisors may, at any time, add other roads to the county road system provided for in this act, but the same procedure must be followed. The total mileage included in the county road system must not exceed twenty per cent. of the total mileage of all the public highways within the county. "It shall be the duty of the boards of county commissioners and supervisors to purchase and provide suitable adequate graders, rollers, and all other machinery, tools and appliances necessary for the efficient maintenance and repair of the county roads; and it shall be the duty of the county highway commissioner to devote his time constantly to keeping the system of county roads in perfect condition and repair, and to see that they are regularly dragged. As soon as the county roads have been designated and established the roads are to be divided into sections, designating each section by some appropriate number, name or letter, and clearly designating the starting point and terminus of each such section, and this designation shall be recorded at length by the county clerk in a county road book. The county highway commissioner is then to proceed to survey the roads and report to the county board of commissioners or supervisor the plat for the road, bridge, tile and culvert work thereon. Such survey and report shall be the basis and with the object in view of the permanent improvement of such roads, as to bridge, culvert, tile and road work. Such survey and report shall consist of an accurate plan and profile of such roads showing cuts and careful attention to drainage, and said plan and profile shall show all existing bridges, culverts and grades."

Commission Paves Streets Against Protest.

Ogden, Utah.—Property owners in paving district No. 125, have lost their suit to prevent the paving of the district and the collection of special taxes to pay for the improvements. The construction work, which was begun a few weeks ago, will be rushed to completion on orders from the city offices. The property owners, who objected to the improvements, contended that the front feet owned by objectors represented 67½ per cent of the total frontage. It was the contention of the city, that the number protesting was less than two-thirds. Since more than two-thirds of the property must protest to prevent the improvements the city held it had the right to proceed with the paving. Hundreds of property owners are affected by the case since the district includes fourteen blocks to be paved with asphalt. The trial was marked by frequent expressions on the part of the objectors, indicating great bitterness toward the city commissioner. The case may be taken to the supreme court. Papers filed in the case in the district court show that on February 14, 1917, the city engineer made a report to the city commission that owners of property protesting against the paving with frontage on the paving district, amounted to 67.12 per cent of the property owners of the district. Records in the case show that on and prior to, February 5, 1917, more than 66 2/3 per cent of the property owners had protested against the paving; and that prior to the time the city commission took action on the matter, others had filed protests against the paving work, which brought the total number of protests up to more than 80 per cent of the frontage on the paving district. Despite the sentiment against the paving work, the commission went ahead with its plans. Mayor Abbott R. Heywood and investigators discovered that one of the property owners in the paving

district had transferred part of his property to his wife after he had protested against the paving. She made affidavit that she also was opposed to the paving. The commission threw out her protest and refused to count the frontage as being against the paving work. O. J. Stilwell, officer in a realty company registered his protest against the paving work. The city commissioners decided that technically the realty company should have done the protesting, instead of Stilwell. So it was with other similar protests. Mayor Heywood by legal objection succeeded in pruning down the number of protestants until the number was just a little less than 66 2/3 per cent of the property owners in the district.

City to Make Sidewalk Repairs.

New York, N. Y.—Despite an adverse report of the committee on thoroughfares, the board of aldermen has adopted an ordinance providing for the repairing of sidewalks at the expense of the city instead of the owners of property facing public streets. This measure, introduced by alderman Charles H. Haubert of Brooklyn, had been pending for more than a year. Numerous public hearings, conducted by the committee on thoroughfares, were held on the matter and there appeared to be an overwhelming sentiment on the part of property owners in favor of the proposed change in the law, but the committee was not convinced and it recommended the filing of the ordinance. In its report the committee said: "It is the consensus that the change would be of little benefit. It might directly relieve a considerable number of property owners, but would cause a considerable increase in the tax rate, and thereby increase the burden of all taxpayers." There was a question as to whether the board of aldermen had the power to change the law relating to the repaving of sidewalks, and the corporation counsel was asked to render his opinion. It was favorable. There are no definite figures on what it will cost the city to keep the sidewalks in Greater New York in repair. Some estimates have gone as high as \$2,000,000 a year, but alderman Haubert claims that the cost will be less than a million dollars.

SEWERAGE AND SANITATION

Fight Over Site of Disposal Plant.

Wilkes-Barre, Pa.—Hanover township has the right to erect its sewage disposal plant on a site purchased by the commissioners, according to a decision handed down by judge Strauss in which he holds that the court has no legal right to impose its judgment upon the township authorities in view of the fact that their action cannot be considered as arbitrary, unreasonable or without fair cause to support it. The judge dismisses the preliminary injunction against the Hanover commissioners. In deciding the case against the plaintiff the court holds that he had not established by proof that a system of sewage disposal such as designed for

the plant in question would permit foul gases and stenches or interfere with the actual comfort and health of persons living in the immediate vicinity, although he had proved that the establishment of a sewage disposal plant damages the value of real estate for sentimental reasons. The action was taken by the plaintiff after the township commissioners had awarded a contract to build its sewer system and had bought the land for the disposal plant. He was joined by others. The city of Wilkes-Barre, while not appearing as a plaintiff, gave testimony to show that the disposal plant would affect its growth. While deciding in favor of the township Judge Strauss holds that perhaps Hanover township and Wilkes-Barre city would benefit in the long run if a more southerly site were selected even if it might entail an additional expense of \$100,000. The construction of a sewer system and disposal plant was not objected to by the plaintiffs in general. The objection was against the site, the plaintiffs suggesting that a point below Breslau be agreed upon by the township commissioners for the proposed plant. Judge Strauss took up the matter of changing the site with the commissioner of health and the state officials were favorably disposed, but the township officials concluded not to make application for the change of site.

Report on the 1916 Poliomyelitis Epidemic.

Washington, D. C.—The United States Public Health Service has just published a brief report on the epidemic of infantile paralysis which swept sections of the country last summer. The statement says: "The year 1916 was one characterized by an unusual prevalence of poliomyelitis throughout the United States. In many localities the disease became epidemic. Poliomyelitis has been with us for several decades, occasional cases being reported here and there throughout the country during all months of the year. There have usually been more cases in the summer than in the winter months. The principal epidemic area last year comprised northern New Jersey, southern New York, and most of Connecticut, Massachusetts and Rhode Island. Special interest in the disease was aroused about the first of July by its unusual prevalence in New York city. The New York city epidemic began about the middle of June. Early in July increasing numbers of cases were being reported in Newark and Jersey City, N. J., and neighboring communities. By July 15 the disease was on the increase in Philadelphia, Bridgeport, Camden and Toledo. By the first of August cases were being reported in Baltimore, Boston, Chicago, St. Paul and Minneapolis, Providence, Syracuse and Trenton. The disease was at its height in July, August and September. In December, after the disease had subsided elsewhere, an outbreak developed in the northeastern part of West Virginia with foci at Elkins, Grafton and Fairmont. The localities which were particularly invaded during 1916 are shown on the accompanying map. Billings, Mont., which is not on the map, also had a considerable outbreak in proportion to its population. It is interesting to note that a greater number of cases was reported during the first four months of the year in Vir-



Relative Prevalence in States.



Localities Attacked by Disease.

THE POLIOMYELITIS EPIDEMIC OF 1916.

ginia than in any other state. In a few of the states there was an increase in the occurrence of the disease during May and June, but in most of the states the distinct increase began in July, and in Maine and Vermont not until August. The highest reported case rate for the year was in New Jersey, where there was a rate of 1.376 per thousand population. The next highest rate was that of New York state with a rate of a little under 1.3 per thousand population. Connecticut came next with a reported rate of 0.764 and Massachusetts with a rate of 0.518. Rhode Island was about as heavily infected as Connecticut and Massachusetts. Maryland, Michigan, Minnesota, Montana and Pennsylvania had reported case rates of between 0.2 and 0.5 per thousand population. The other states in which records of the prevalence of the disease were kept had reported case rates of less than 0.2 per thousand. The relative prevalence of the disease in the several states, based upon the number of cases in proportion to the population, is shown in the other map. The more densely shaded states represent those having the heaviest infection. The states without any shading whatsoever represent those in which the reported case rates were less than 0.2 per thousand population or in which the disease is not required to be reported and its prevalence is therefore unknown.

Move for Better Health and Housing.

Baltimore, Md.—Civic forces in the city are uniting for more rapid progress towards better housing. Recently at a well attended meeting of the mayor's Committee on Public Health and Housing this report was presented: "The matters which the general committee can take up at the present time with the greatest advantage to the community are: (1) The question of housing conditions; (2) The development of small parks in several districts of the city; (3) More adequate municipal hospital facilities for advanced cases of tuberculosis; (4) Greater hospital facilities for other infectious diseases; (5) The question of further development of the teaching of hygiene in the public schools; (6) The question of feasible economic diets for the general population. In regard to the general housing conditions, it was decided that in addition to the committee already appointed to investigate and report on the Washington Building Company's plans that it is desirable to investigate the feasibility of establishing in Baltimore an Octavia Hill Association for better housing." The conferring members agreed that it is necessary to have more accurate information in regard to the distribution of tuberculosis, and gastro-intestinal diseases in children, before an attempt is made to decide in what parts of the city and in what specific areas additional small parks may be established to the best advantage. A special worker provided for by a member of the committee under the the direction of the Health Department, has completed a card index of the fatal cases of tuberculosis for the past three years, and with the assistance of this index a pin map of fatal cases of tuberculosis is being prepared. This will be ready in a short time. The health department's maps of living cases of tuberculosis reported to the department and visited by the city nurses during 1916, is now in course of preparation. When these, and a similar pin map showing the deaths from gastro-intestinal diseases in 1916, are completed material will be at hand for the work of the sub-committee to be appointed on small parks. These maps will also be valuable for use by the sub-committee on housing.

Child Hygienic Work Reduces Infant Mortality.

Newark, N. J.—Continued reduction of the city's infant mortality rate is shown by a tabulation of deaths of babies under one year of age for the first quarter of this year, just made by the division of child hygiene of the board of health. The rate is 82.5 deaths per 1,000 births, as compared with 94.8 for the first quarter of 1916. The total of births for this period was 3,079. Of these babies, 2,393 came under the hygiene bureau's supervision, and thirty-four died. However, while all these deaths are included in the department's reports, thirteen infants died in the first few days of life, before the bureau's nurses had even called. If the thirteen are omitted, the death rate becomes 8.7 for supervised babies. As an explanation of the great reduction effected, Dr. Julius

Levy, director of the bureau, points to the prenatal care given by the bureau and the cumulative effects of the intensive work among mothers. Much has also been accomplished, Dr. Levy feels, by the supervision of midwives and the organization of an association among them for the purpose of stimulating them to higher standards, affording them opportunities to attend special lectures arranged by the bureau, and providing a supervisor of their work. Dr. Levy has urged that the laws be altered to permit his division to hold the power to revoke the licenses of midwives, but this suggestion has not the approval of the state board of health, which claims this city is the only one in the state organized with a special division for infants, and that women disqualified here could practice in the immediate suburbs. The division has published a "Baby Primer" which it prepared and which was printed and is being distributed by the Prudential Insurance Company of America, which has its home offices in Newark. The booklet emphasizes the need of proper registration of births and care of eyesight at birth; describes the proper methods of feeding; warns of attention to clean sources of milk supply; describes correct methods of handling milk and urges cleanliness, fresh air and protection from flies and mosquitoes. The primer is practically a duplicate of the division's exhibit. It is very attractively gotten up and the terseness and simplicity of its teachings are proving strikingly effective. Much of the division's work has been with mothers in neighborhoods of large foreign population and the value of the advice and also the educational methods is convincingly demonstrated by the marked success in reducing infant mortality. The work is organized on a district basis.

WATER SUPPLY

Water Plant Cancels Loan Due 1930.

Providence, R. I.—Although it is not due until May 1, 1930, the city has called in and paid off considerably more than half the \$2,666,000 water refunding loan. Only \$1,127,000 of the issue remains outstanding. City treasurer Clarke is buying in the bonds wherever he can find them and they are being cancelled by the city council finance committee. The issue bears interest at only 3 per cent, and consequently the city is not meeting the usual difficulties in obtaining the bonds at a satisfactory figure long before their maturity. The original issue was floated to refund two old bond issues sold by the city in 1866 and 1869, respectively, to provide funds for the construction of the present municipal water supply. These two issues aggregated \$4,000,000, and when they came due the sinking funds were not sufficient to meet them and the refunding of more than half the amount was necessary.

City Loses Against Waterworks Contractor.

Cozad, Neb.—The State Supreme court has decided that this city must pay the contractor, the Katz-Craig Contracting Co., the full amount of the final estimate given by the engineer whom the city retained to supervise the work, and that claims for deductions made by the city after the final acceptance of the work by this engineer are invalid. The contract provided that final payment should be made upon approval and acceptance of the work by either the city council or the engineer. The engineer accepted the work and the city council intended to do so, but was prevented from making the final payment by the mayor. The city, however, took over the waterworks and used it from the time of its acceptance. The court held that the city was estopped by this action from claiming that the work was not satisfactory. It held that where a supervising engineer is employed by a city to inspect and approve construction work, and is named as the sole arbiter between the contractor and the city, his final estimate is binding upon the city as well as upon the contractor, unless fraud can be shown. The case has been in the courts since 1911, although the total amount involved is not as much as \$7,000.

City Wins Water Rights in Court.

Denver, Col.—The state supreme court has decided that the city of Denver is entitled to \$200,000 worth of water rights in the city's irrigation ditch which Sherman Brown, clerk of the district court, and others attempted to appropriate. In its decision the court severely criticised the lower court for attempting to ignore the order in the city ditch case, after it had reversed the decision of judge George W. Allen. Judge Allen since has been elevated to the supreme bench, and he, together with supreme Justice Scott, did not participate in the ditch case. The opinion censures the lower court and the city attorney's office, then represented by I. N. Stevens, that modification of the mandate such as originally ordered by the supreme court, was a direct blow at the "harmony of the judicial decisions." The case was decided in judge Allen's court in favor of Sherman Brown and others on their assumption that they had priority claims to the water rights. The city appealed and the supreme court reversed the findings of the lower court, directing that tribunal to decide the case in the city's favor. When city attorney James A. Marsh took up the case he found it necessary, because of certain modifications granted in the meantime by judge Sheafor of Colorado Springs, sitting for judge Allen, to demand original jurisdiction from the supreme court in the matter.

STREET LIGHTING AND POWER**Cities Protest Gas Rate Increases.**

Boston, Mass.—Complaints are pouring into the office of the State Gas and Electric Light Commission in rapid succession against the general increase in the price of gas. Increases range from five cents to fifty cents a thousand feet and most of them already have gone into effect. In the majority of cases, complaints have been made by telephone or letter, but a formal complaint has been made by the citizens of Amesbury. The price of gas there has been increased from \$1.50 per thousand cubic feet to \$2. Commissioner Solomon Lewenberg declared that the complaints will be investigated as quickly as possible, but added that a formal complaint, the only kind which can be considered by the commission, requires the signature of the mayor of a city, the selectmen of a town, or the signatures of twenty citizens. The commission announced the following changes in the price of gas in the following places: Holyoke (municipal company), 90 cents to \$1; Worcester, 75 cents to 85 cents; Westfield (municipal company), \$1 to \$1.25; Springfield, 85 cents to 90 cents; Ware, \$1.50 to \$1.75; Amesbury, \$1.50 to \$2; Cambridge, 80 cents to 90 cents; Quincy, \$1.10 to \$1.20; New Bedford, 80 cents to 95 cents; Malden, 90 cents to 95 cents; Revere, 90 cents to 95 cents. The New Bedford and Malden increases will not become effective until August 1. In Pittsfield, the 10 per cent. reduction for prompt payment has been reduced to 5 per cent. In all cases gas companies claim that the increased cost of coal and oil make it imperative that the price of gas be raised.

Municipal Hydro-Electric Plant.

Rochester, Minn.—Hundreds of acres of land will be covered by the reservoir to be formed by the building of Rochester's municipal dam on the Zumbro river. Much of the land is covered with timber. This will be part of the first publicly owned hydro-electric plant in the state and will generate power enough not only to supply Rochester, but several towns in the neighborhood. Its cost is estimated at \$750,000. The dam will be constructed of concrete and will probably be 60 feet high.

City Awarded Sales Percentage.

Columbus, O.—The Federal Gas and Fuel Co. must pay the city of Columbus \$261,485, with interest, according to a decision of the Ohio supreme court, upholding a recent judgment by Franklin county appellate court. The debt dates back to October 12, 1905, from which date the city asked an accounting for "10 per cent. of all moneys received from the sale of natural gas sold here at a price exceeding 15 cents per 1,000 cubic feet." The city's demand was based on a contract with the gas company entered into when the city granted its franchise in 1899. The gas company, fighting the suit, claimed it owed nothing at all for gas sold in parts of Columbus annexed since 1899, and also that it owed only 10 per cent. of all money received in excess of 15 cents per 1,000 for gas sold in that part of the city which was inside corporation lines in 1899. Master commissioner Robert W. McCoy, appointed to thresh out the matter, ruled the city should have 10 per cent. on the total amount collected for all gas sold, whether at 15 cents per 1,000 or more. He figured the gas company's debt at \$183,670—but common pleas court pared this amount to \$86,265. Appellate court later sustained McCoy's finding, and after computing interest to December 16, 1916, fixed the total of the gas company's debt to the city at \$261,485. Supreme court upheld the appellate court verdict.

FIRE AND POLICE**Improving Cleveland's Fire Department.**

Cleveland, O.—Council has passed an ordinance to authorize the director of public safety to expend \$99,900 for the purpose of erecting buildings necessary for the fire department and the purchase or condemning of necessary land therefor, and for the purchase of motor driven fire apparatus and extending fire alarm signal system. Passage of the ordinance was recommended by the director of public safety, committee on fire, director of finance and director of law, as an emergency measure.

East St. Louis Police Board Resigns.

East St. Louis, Ill.—In response to popular demands after the recent bloody race riots, resignations of the three members of the board of police and fire commissioners were accepted by the council. A new board, consisting of Edward J. Coffee, Dr. J. F. Reid and Frederick Giessing, was appointed by mayor Mollman and approved by the council. Members of the old board who resigned were Wallace C. Watkins, Nelson A. Schein and William Schmidt. They gave as their reason that they did not care to embarrass the administration by remaining on the board after the criticism following the race riot. The citizens' committee, a branch of the Chamber of Commerce, had asked mayor Mollman to discharge the present board.

All Firemen Called Out.

San Antonio, Tex.—In one of the worst and also the most spectacular fires here in many years a four-story building occupied by a bank and a wholesale grocery and liquor warehouse was destroyed with a loss of about \$225,000. The cause may never be definitely determined. It started at the rear of the building near the freight elevator shaft, and being less than a block from the central fire and police station, the firemen were soon at the scene. Apparently they were powerless to check the spread of the blaze, however. Within twenty minutes after the arrival of the first company a second alarm was sent in and every engine and piece of fire fighting apparatus available in the city was called out. Dense clouds of pungent smoke from the windows proved a big handicap in fighting the stubborn blaze. Scores of soldiers attracted to the scene served as volunteers to assist the firemen and aided in carrying the hose. Despite this the firemen made little headway against the blaze and it continued to eat its way from floor to floor. It was more than an hour and a half after the fire started before it was declared under control. The smoke proved a menace to the firemen and the soldiers volunteering to assist them. Scores were overcome temporarily and were able to return to the fight only after a rest beyond the smoke zone.

RAPID TRANSIT**Board to Study Traffic.**

New York, N. Y.—The Board of Estimate and Apportionment has authorized the appointment of a traffic commission for the purpose of considering the entire problem of traffic congestion and the most efficient and economical

plans for the future development of the city's thoroughfares. This action was taken on the report of the board's committee on the City Plan on petitions asking for the appointment of a traffic commission from the Fifth Avenue Association, Street Association, City Club of New York, Murray Hill Association, Wholesale Dry Goods Center Association of New York, Broadway Association, the Merchants' Association, Advisory Council of Real Estate Interests, the Citizens' Union, Van Owners' Association, New York Furniture Warehousemen's Association, the Chamber of Commerce of the State of New York and the Central Mercantile Association. The communication of the Fifth Avenue Association referred to the success of the work of the Zoning Commission and suggested that the traffic problem be handled in much the same way, that is, by the appointment of a commission of citizens working in co-operation with the city bureaus and departments. The commission is directed to consider: (1) Traffic regulation and other means of increasing the capacity of existing streets; (2) means of separating grades at important intersections, elevated roadways for through traffic, two-level streets, street widenings and new streets; (3) a complete system of auto and trucking thoroughfares for the five boroughs, with special reference to the linking up of the boroughs and to the linking up of the city as a whole with neighboring centers in Nassau and Westchester counties and in New Jersey. The members of the commission are to serve without pay and no positions will be created or appropriations made to take care of the work of the commission. The secretary of the committee on the City Plan is secretary of the commission and Nelson P. Lewis, chief engineer of the Board of Estimate, and the borough engineers will make the necessary engineering investigations and reports. Robert H. Whitten, secretary of the Committee on the City Plan, states: "The traffic problem is now recognized as one of the most important problems connected with the physical development of the city. The enormous burden imposed upon our street facilities has increased street accidents and retarded the flow of traffic to an alarming degree. The increase in shipments and other business in the city and port of New York incident to the war will make existing traffic delays all the more intolerable. The regulations of the Police Department have been effective in relieving the growing congestion, but regulation has now gone about as far as practicable and it is now more a question of actually increasing the capacity of the roadways or of providing additional or relieving roadways."

The number of accidents occurring in the streets show a decided increase, according to a report by police commissioner Woods, who supplemented the report with a request to merchants and business houses that they carry on their transfer of cases and goods between the hours of 4 and 8 a. m., when pedestrian traffic is lightest. Boss truckmen objected to the proposal, and M. J. Cashel, president of the International Brotherhood of Teamsters, said his organization was unalterably opposed to working in such hours. The report disclosed that the greatest number of accidents happen between noon and 8 o'clock at night, the statistics indicating that sixty-three per cent take place during that period, with only twenty-four per cent happening within the safety hours recommended by Commissioner Woods. During the last six months 12,284 persons figured in street accidents as against 10,593 for the same period last year. In the last month there have been 565 more accidents than in June, 1916; automobile accidents jumped from 650 to 1,037 and motorcycle mishaps registered 60, as against 40 for June last year. The only decrease was in horse-drawn traffic accidents, which was tabulated as of June, 1916, 230; this year, 194, and in the number of persons who were injured when alighting from surface cars, this month's figures showing a decrease of three.

City's Car Receipts Share Grows.

Newark, N. J.—The Public Service Railway Company has turned over to city controller Moody a check for \$199,948.65, which represents five per cent of the receipts of the company from passenger traffic within the limits of the city. A year ago the receipts of the city from the same

source was \$177,651.07, and the year before that \$178,422.68. The gross receipts from all of the company lines operating in this city amounted to \$6,776,041.50, and of this sum \$3,998,973.65 was found to be taxable under the law. The check does not represent all the Public Service will have to pay to the municipality, for under the same state law by which Newark ordained that the trolley company would have to pay the five per cent on its gross receipts there is a provision that such a payment is "on account of" or "in lieu of" the five per cent requirement as apportioned to the various municipalities of the state. This means that where the Public Service's percentage does not measure up to the sum as apportioned by the state the company must make up the difference. This year it is estimated the company will have to pay about \$5,000 additional. President Thomas N. McCarter, who issued a formal statement with the figures, attributes the increase over last year's figures to the business of an abnormal year as compared with a subnormal year. Mr. McCarter points out that the unusual industrial activities of the last year, as well as the abnormal travel within the city during the celebration of the city's 250th anniversary, are responsible for the increase in receipts this year. The probable effect of the jitney service on the trolley traffic is not shown in the amount turned over to the city. There is evidence, however, that the jitneys dug a hole in receipts from at least one line. In the case of the South Orange line, not materially affected by the extra demands for accommodations during the celebration, the receipts in 1916 were \$668,390.61. At that time the operation of the jitneys along that thoroughfare was impeded to such an extent that not many of them ventured to make the trip, owing to poor pavement. The receipts this year amounted to \$643,672.14, or a decrease of almost \$25,000. Mr. McCarter pointed out that "The amount turned over to the city is equivalent to almost five points in the tax rate, for if this money was not forthcoming from the railway company for the city's uses the amount would have to be added to the sum that will be raised by taxation. When one considers this payment, together with the street paving obligations, the free service to certain city employees and other forms of indirect taxation the company must meet, it can readily be seen that we are supplying something more than transportation for the nickels we get."

To Extend Seattle Municipal Railroad.

Seattle, Wash.—City council has passed four ordinances providing for improvements to the city's street railway system. One bill authorizes the extension of one of the lines into Bullard to cost \$25,000, one provides for the connection of two of the divisions by an elevated line across the south end of the city at a cost of \$330,000; one for altering the system on division "A" from a double to a single wire, at a cost of \$5,000, and the fourth authorizes the appropriation of \$25,000 from the depreciation fund of the city lighting department as a temporary loan to the street railway bond fund. Eight new one-man cars are to be bought for \$25,000.

"Memory Treatment" for Law-Violating Motorists.

Detroit, Mich.—Detroit motorists have spent over \$15,000 on commissioner Couzens' "memory treatment" since last March. Since the impounding ordinance went into effect, 5,000 machines have been hauled to Cadillac square and chained, to be released only when the owners handed over the \$3 impounding fee. Police at first thought that a few weeks of energetic enforcement of the ordinance would cause the drivers to remember the parking rules, but, besides finding scores of "first offenders" every day, the pound is visited at frequent intervals by some on whom the \$3 punishment seems to have little effect. Six policemen, in three towing crews, and two men assigned to the pound, are kept busy all day and every day. The greatest number of cars towed to the pound in one day was 115.

MISCELLANEOUS

Cities and the Food Supply in Massachusetts.

Boston, Mass.—Out of the 354 cities and towns in the state, 325 have their local food production committee, ac-

cording to a statement from the sub-committee on food supply in the state house of the general Massachusetts committee on public safety. This sub-committee will doubtless continue its activity during the entire season. It is now promoting the preservation and the distribution of the food products whose raising it stimulated to the utmost during the planting season just ended. Fitchburg is one of the points of interest for the committee in view of the plan reported from there whereby there is a central canning plant for the preservation of products brought in by the raisers. It seems to the committee here quite feasible for other cities to follow the plan of having high school girls, under supervision, work at a charge of 15 cents an hour for their labor in canning whatever garden products are brought in to them. The city of Quincy has established a public city market. The food supply committee will send circulars to other cities telling about the details and trying to get them to introduce a similar system. Quincy will have a public market day on Wednesdays and Saturdays for the growers of fruit and vegetable in that vicinity. Space will be provided on tables which will be rented by the city for 20 cents a day for Wednesdays and 30 cents for Saturdays. In bad weather they can be under cover, but otherwise it will be practically an outdoor market. In addition there will be sales by the city on which a commission will be charged, varying from five cents as a minimum to 10 per cent of the selling price for the larger articles. It is expected that the commission method will be of advantage to the school children who cannot give their time to selling their products. In any case, the commission is to be charged only to those who do not rent tables, who cannot give their time and who put their stuff into the hands of the city to sell. One of the rules of the business is that there shall be no agreement among the sellers to maintain prices. In every case, the buyer and the seller are to make their own terms.

The Massachusetts Housing Experiment.

Boston, Mass.—The governor's council has approved the request of the homestead commission that it be allowed to take the first steps toward erecting homesteads in the city of Lowell at cost to citizens, and the commission desires to engage the services of Arthur C. Comey at \$500 to supervise the development of the plans and the construction of the buildings. It also desires to pay Kilham & Hopkins as architects \$100 per house to prepare plans for from 12 to 20 houses. For this sum the architects agree to furnish complete specifications and working drawings, to manage all details of the construction and to superintend the construction by a special agent on the ground. The council approved both requests and authorized the commission as soon as specifications are prepared to advertise for bids for the construction of the houses. The commission has in mind fourteen parcels of land in Lowell, all of which are suitable and five or six of which are desirable locations for carrying out the project. Verbal option has been secured on all the desirable parcels, but the commission does not intend to purchase any of them until the governor's council has seen and approved complete plans. The homesteads are intended for wage earners and a bill authorizing the Massachusetts homestead commission to expend \$50,000 for purchasing a tract of land in this city was reported favorably by the committee on social welfare in April.

City Wins Long Smoke Abatement Suit.

Yonkers, N. Y.—The case of the city of Yonkers against the Federal Sugar Refining company in which the sugar company obtained a judgment against the city for the sum of \$37,778.21 has been reversed in the court of appeals and a decision rendered dismissing the proceedings; cost in all the courts in favor of the city. This is the end of a long litigation. In August, 1907, there was a complaint made by some of the property owners who lived in and about the locality of the Federal Sugar Refining company plant that their property was being damaged and they were being annoyed by reason of the fact that the company was using soft coal and discharging soot and cinders. A resolution was passed by the common council directing the city attorney during mayor Coyne's term to institute proceedings

and apply for an injunction against the Federal Sugar Refining company. Application was made to justice Morchauer and a temporary injunction was granted as against the company. Thereafter the temporary injunction was vacated and the matter sent to a referee to determine as to whether or not a nuisance was being committed. After many hearings the referee decided against the company and in favor of the city. Thereafter an appeal was taken by the company to the appellate division, who reversed the judgment of the referee and held that the city was not the proper party to bring the action. The city took an appeal to the court of appeals and the court of appeals sustained the lower court. Thereupon the Federal Sugar Refining company applied for the appointment of a referee to assess the damages that they had incurred by reason of the injunction. The matter was referred to J. Addison Young. While the case was pending before him he was elected a justice of the supreme court and had to resign as referee. An order was then made referring the matter to Charles H. Young and after numerous hearings he rendered an opinion against the city for \$37,778.21. An appeal was taken by the city to the appellate division and the appellate division affirmed the report of the referee, with the exception that it reduced the amount of the damages. An appeal was again taken by the city to the court of appeals and the matter was argued in the early part of June.

Municipal Recreation Facilities of United States.

Washington, D. C.—A report under the title of "General Statistics of Cities, 1916," about to be issued by the Bureau of the Census, Department of Commerce, presents some interesting data relating to parks, playgrounds, zoological collections, swimming pools and bathing beaches and other recreation facilities in cities having more than 30,000 inhabitants. In all but two of the 213 cities covered by the report, certain areas owned by the municipalities are specifically set aside as public parks. The aggregate number of these parks, as reported for the fiscal year 1916, was 3,857, and their combined area amounted to 117,006 acres, or 183 square miles. By far the greatest number of parks, 417, was reported for Washington, D. C., but the greatest park area—7,713 acres, or about twelve square miles—is shown for New York City. Other cities with large park areas are Philadelphia, with 5,500 acres; Los Angeles, with 4,127 acres; Chicago, with 3,815 acres; Denver, with 3,719 acres; Washington, D. C., with 3,067 acres, and Minneapolis, with 3,038 acres.

The large number of parks reported by Washington, D. C., is due to the utilization by that city of triangles and other small spaces for park purposes. The numerous avenues of Washington run diagonally, as compared with the general street scheme which results in a large number of triangles. These spaces are improved, having lawns, flowers, shrubs and walks, and in many of them benches are provided. Similar areas in other cities are generally used for building purposes. The largest single park owned by any city is Fairmount Park, in Philadelphia, which has an area of 3,526 acres, or five and a half square miles; and the next largest, a park of 3,027 acres, or more than four and a half square miles, is reported for Los Angeles.

The greatest area of parks and other public grounds inside city limits in proportion to population—one acre for each fourteen inhabitants—is shown for Quincy, Mass. (Of the total park area reported for this city, however, about 96 per cent was administered and maintained by the metropolitan park commission of the state.) Other cities reporting more than an acre to each 100 inhabitants are San Diego, Cal., with 26 inhabitants per acre of park and recreational grounds; Lacrosse, Wis., with 43; Council Bluffs, Iowa, with 45; Lynn Mass., with 52; Sioux City, Iowa, with 64; Harrisburg, Pa., with 77; Hartford, Conn., with 84; Niagara Falls, N. Y., with 87; Washington, D. C., with 97, and Covington, Ky., with 99. The states of Massachusetts and Rhode Island maintain metropolitan park systems. That of Massachusetts covers thirty-eight cities and towns, including Boston and Cambridge. The Palisades interstate park system is administered jointly by New York and New Jersey.

Zoological parks were maintained in 83 of the 213 cities covered by the report. Their aggregate collections comprised 8,125 mammals, 17,851 birds, and 829 reptiles; their buildings were valued at \$5,649,582, and their zoological collections at \$832,134. The greatest number of mammals, 575, was reported by Washington, D. C.

All but 18 of the 213 cities of over 30,000 inhabitants maintained playgrounds (not including those open only to school children during the school year), the total number of such playgrounds being 2,190 and their average area being a trifle more than two acres. The largest number, 185, is shown for New York, and the next largest, 160, for Philadelphia.

A total of 19 athletic fields (exclusive of those located in parks), with an average area of a little less than 8 acres, were reported by 13 cities—4 by Detroit, Mich.; 3 by Sacramento, Cal.; 2 by Hoboken, N. J., and 1 each by the remaining 10 cities.

Facilities for games and athletics in parks, playgrounds and athletic fields were maintained by 176 cities. These facilities included 3,368 tennis courts, 1,334 baseball diamonds, 331 football gridirons, 66 golf courses, and 9 polo fields.

The highest salaried superintendent of recreation, who receives \$5,000 per annum, is employed by Philadelphia. Chicago reports one such official at \$3,900 and one at \$2,340; Baltimore, one at \$3,600 and one at \$1,500, and New York, Boston, Pittsburgh, Newark, N. J., and Oakland, Cal., one each at \$3,000.

Swimming pools and bathing beaches were provided by 111 cities whose total facilities in this respect comprised 117 outdoor swimming pools, 61 indoor swimming pools and 149 bathing beaches, at which the aggregate attendance during the year was more than 26,000,000.

Museums and art galleries were administered by 33 cities, and in 17 cities such institutions were under private administration, but received municipal aid.

The expenditures for recreation purposes (excluding outlays) in cities of over 30,000 inhabitants during the fiscal year 1916 aggregated \$21,637,097, or 67 cents per capita. The greatest per capita expenditures under this head which are shown for any one city were reported by Brookline, Mass.—\$4.68.

Although the report relates mainly to municipal recreation facilities, it presents a few interesting lines of information in regard to national parks and national forests, obtained from the reports and records of the Department of the Interior and the Department of Agriculture, respectively.

Sixteen national parks are maintained by the Federal Government, including one in Hawaii. The others are in Arizona, Arkansas, California, Colorado, Idaho, Montana, North Dakota, Oklahoma, Oregon, South Dakota, Washington and Wyoming. Yellowstone National Park, located in Wyoming, Montana and Idaho, is by far the largest, having an area of 3,348 square miles, nearly as great as that of Rhode Island and Delaware combined. Glacier National Park, in Montana, and Yosemite National Park in California, rank second and third, respectively, in size, the area of the former being 1,534 square miles and that of the latter 1,124 square miles.

The Sequoia and General Grant national parks, in California, contain many of the famous "big trees" (*sequoia gigantea*), which grow to a height of 300 feet, with a diameter of thirty feet, the bark being two feet thick.

The only active volcano in the United States proper—Lassen Park—is found in Lassen Volcanic National Park, in California.

Under authority of an act of Congress passed in 1891 the President of the United States is empowered to set apart public lands bearing forests as public reservations. The primary purposes of the national forests are to insure continuous production of timber and favorable conditions as to flow of water. As means to these ends, strict supervision is maintained over the sale of mature timber and the forest areas are guarded against fire.

These areas are much used by campers, hunters and fishermen. "Recreation maps" are issued, which not only present maps of many of the national forests, showing towns, streams, roads and trails, but contain information pertaining to camp sites, fish and game; and campers' registers are kept at the headquarters of the forest supervisors.

The national forests, 153 in number, are scattered over nineteen states, Alaska and Porto Rico. All but two of these states—Florida and Michigan—lie west of the Mississippi. The total area of national forest land (excluding that of other lands within national forest boundaries) is 244,189 square miles. This area is nearly as great as that of the states of Texas; or of New England, New York, Pennsylvania, New Jersey, Delaware, Maryland, District of Columbia, Virginia and West Virginia combined; or of Ohio, Indiana, Illinois, Michigan and Wisconsin combined.

Committees Propose Municipal Food Utilities.

Spokane, Wash.—A municipal abattoir, a municipal ice plant, another public market with cold storage facilities and a municipal cold storage plant are included in the program laid out for Spokane by two committees of the mayor's price investigation commission. The majority report of the ice committee recommends the ice plant; the cold storage public markets and packing houses committee wants the new market, the abattoir and the cold storage plants. Majority report of the ice committee of the mayor's price probing commission says: "The real reason, in our opinion, for this increase (in the price of ice) is the fact that one company has, by suppressing competition, secured a substantial monopoly of the supply and arbitrarily increased the price. The city does not have the authority to regulate the prices charged for this commodity (ice). It does not have the power to install a municipal ice plant

and we therefore recommend that the city purchase and conduct such a plant." The claim of local companies that increased cost of production justifies the increase is not justified, says the probers. "We examined the books of the companies," they say, "but were unable to verify their statements as to the losses sustained during 1916, because the books and accounts were kept in such a manner as to render an inspection of no value or aid to the committee. It is true that the price of feed and labor has increased, but the Mowbray Pearson Company is, despite these facts, selling at 1916 prices and presumably making a reasonable profit. The experience of this company refutes the claim of those companies that have increased the price." Cost and production data gathered by the committee show that the city uses about 25,000 tons of ice each year and that about 3,000 families in the city use ice. Says the report: "The supply of natural ice is unlimited, but because of shrinkage in transportation it is not as economical as artificial ice, neither is it as sanitary. The cost of manufacturing ice varies from \$1.12 to \$1.50 a ton."

Federal action is the only hope for relief from abnormal prices for foodstuffs caused by combinations for manipulating markets and cold storage plants. Local action looking toward a relief from the present situation not only would be a duplication of effort and energy, but, because of its limited scope, practically worthless. This is the gist of a final report by Mrs. J. M. Simpson, W. H. Farnham and Al Germain, the packing houses, public markets and cold storage committee of the price probing commission. The report continues: "We would recommend that if within a reasonable time relief is not obtained through federal, or even state action, the proper municipal authorities take active steps to establish an abattoir and cold storage plant of sufficient capacity to insure our citizens a reasonable supply of meats and such other necessities as would be properly handled by such plants." Regarding public markets the committee says: "This committee has very thoroughly gone into the question of public markets generally and the desirability of a municipal market or markets in this city. To a questionnaire sent out to the mayors of 33 cities we received 25 answers, and in all but five, successful public markets are being maintained. We are unanimously of the opinion that municipal public markets are a success and that after the initial cost of installation a centrally located market should be self-supporting. It would tend in a great measure to largely reduce the cost of farm products to the consumer and would give the producer a better price for his produce." The increase in the price of food and clothing in Spokane is "due to abnormal demand caused by the war, shortage of crop and speculation. Speculation in food and land must be eliminated." So say the probers appointed by the mayor to investigate the rise in food and clothing prices in the city. The report was formally filed with W. F. Worcester, secretary of the commission of fifteen. Control of prices is a national problem, in the opinion of the committee, and little can be done locally.

Testing of Gasoline Pumps.

Trenton, N. J.—A ruling was recently announced by state superintendent of weights and measures Frank Wanser. An order has been promulgated by his department which requires that dealers using automatic devices for the sale of gasoline, must make tests of these machines each day before the first sale and also before commencing to use a new supply of liquid, so that the accuracy of the device may be assured. For the purpose of the testing, standard liquid measures of one-gallon and five-gallon capacities are to be used. Superintendent Wanser points out that it is to the interest of the dealer as much as the consumer that these tests be made, as it has frequently been demonstrated that these liquid pumps are likely to show discrepancies to the detriment of the dealer, as they have been known to have delivered more than the required quantity. Each motorist is also advised by the state superintendent to see that the hose from the measuring tank is not removed from the tank in the automobile until all the liquid has been removed from it.

LEGAL NEWS

A Summary and Notes of Recent Decisions—
Rulings of Interest to Municipalities**Right to Open Alley—Compensation for Closing.**

(Tex. Civ. App.) Where lot owners, purchasing by plat dedicating an alley, had a special right in having the alley left open, the city could not destroy it without making itself liable for compensation.—*Bowers v. Machir*, 191 S. W. 758.

Assessments—Block System.

(N. Y. Sup.) The block by block system in making assessments in street opening proceedings is proper, and should be applied save in exceptional cases.—*In re Second and Third Sts. in Borough of Queens*, 163 N. Y. S. 521.

Certification of Bill—Lack of Funds.

(N. Y. Sup.) Want of funds of a municipality to purchase fire apparatus is a defense, to be alleged and proved, in an action to compel certification of the bill for such apparatus, and failure to allege cuts off the defense.—*People ex rel. Mulholland Co. v. Nowak*, 163 N. Y. S. 174.

Contracting Powers of Cities.

(Mo. App.) Rev. St. 1909, § 2778, restricting the contracting powers of cities of the fourth class, is intended for the protection of the city, and not for the protection of those who become obligated to the city.—*City of Weston v. Bank of Greene County*, 192 S. W. 126.

Change of Grade—Assessments.

(Wash.) Where a municipality, having been awarded judgment against a county for cost of changing grade necessitated by a county improvement, failed to change the grade, and was absorbed by an adjacent city, such city could not assess for benefit for changing the grade, since it was liable for obligations of the first city and bound by the judgment.—*In re Shilshole Ave.*, 162 P. 1010.

Police Power—Constitutionality—Private Rights.

(U. S. D. C.) An ordinance, to be valid under the police power, must have some relation to one or more of the objects of such power, must not conflict with state or federal Constitution, or statutes, and must not arbitrarily, unnecessarily, or unreasonably invade private rights.—*Chicago, M. & St. P. Ry. Co. v. City of Minneapolis*, 238 F. 384.

Liability for Offensive Operation of Sewage Disposal Plant.

(Md.) A municipal corporation is liable to a property owner specially damaged by the construction and operation of a sewage disposal plant which caused such offensive odors as to be a nuisance, though there was no negligence, and the city had ample statutory authority.—*Taylor v. City of Baltimore*, 99 A. 900.

Payment of Contracts—Indebtedness.

(Mont.) Whether a city in entering upon a contract for a filtration plant incurred an indebtedness depends upon the state of its finances, and if it has on hand sufficient available funds to pay contracts as they fall due, it is a cash transaction, and no indebtedness is contracted.—*McClinck v. City of Great Falls*, 163 P. 99.

Authorization of Bonds—Amounts of Issues.

(Md.) An act (Laws 1916, c. 94) authorizing a municipal corporation to borrow and issue bonds to extent of \$100,000 for purpose of a water and sewerage system, held to authorize an issue in two series of \$50,000 each, one for water, and other for sewerage.—*Seyboldt v. Town of Mt. Rainier*, 99 A. 960.

Insufficient Petition—Ability of Contractor to Recover.

(Kan.) Where city upon insufficient petition of abutting owners let paving contract, and in taxpayers' suit under Civ. Code, § 265 (Gen. St. 1915, § 7163), was enjoined from levying assessments, contractor, knowing of pendency of suit before commencing work, though no temporary injunction issued, could not recover on contract, nor for less of profits or damages.—*John Ritchie & Sons v. City of Wichita*, 163 P. 176.

Protection of Municipality from Liability.

(Cal.) Under common law municipality is protected from liability only while exercising delegated functions of sovereignty.—*Chafor v. City of Long Beach*, 163 P. 670.

Change in Grade—Liability.

(Wis.) Where change of grade is made by authority of law and with due care, municipality making change is not liable for consequential injury to abutting lots, unless expressly made so by statute or Constitution.—*Henry v. City of La Crosse*, 162 N. W. 174.

Governmental Duty—Garbage Collection.

(Tenn.) Collection of garbage is a governmental duty for which a municipal corporation is not rendered liable by its employees' negligence provided no nuisance is committed.—*City of Nashville v. Mason*, 192 S. W. 915.

Duty to Keep Open Streets.

(Iowa) A municipal corporation must keep streets open to public travel free from obstructions interfering with ordinary public travel, including automobile traffic, under Code, § 753, placing the duty of street repairs, etc., upon municipalities.—*Wolford v. City of Grinnell*, 161 N. W. 686.

Lowest Bidder—One Bidder.

(N. J. Sup.) The statute (Act April 15, 1911 [P. L. p. 224] § 2) requiring a town to award a contract to the lowest municipal bidder, does not prevent the award of a contract where there was only one bidder.—*Bauer v. Town of West Hoboken*, 100 A. 223.

Water Supply—Liability of Municipality.

(Me.) A municipal corporation engaged in the business of supplying water to its inhabitants is engaged in an undertaking of a private nature, and is liable therein for breach of contract or for negligence as a private corporation would be.—*Woodward v. Livermore Falls Water Dist.*, 100 A. 317.

Extra Work on Sewer—Recovery.

(Mich.) Where sewer construction contract required the order of the board of public works for extra work to be in writing, contractor could not recover for extra work and material except by obtaining such written order.—*Schneider v. City of Ann Arbor*, 162 N. Y. 110.

Police Power—Size and Position of Billboards.

(R. I.) Pub. Laws 1910, c. 542, and Providence Ordinance, c. 443, enacted in pursuance thereof, regulating size and position of billboards, are a valid exercise of police power and constitutional.—*Gilmartin v. Standish-Barnes Co.*, 100 A. 394.

Garbage Dump—Nuisance—Liability.

(Tenn.) A garbage dump, upon which large quantities of material were burned during a high wind, constituted a nuisance rendering the municipality liable, where the fire communicated itself to plaintiff's property.—*City of Nashville v. Mason*, 192 S. W. 915.

Sewer System—Description.

(Ill.) An ordinance for sewer construction describing it as within a village is sufficient to cover an improvement originating within the village but to secure proper pitch carried without the village to empty into a river.—*Village of Bradley v. New York Cent. R. Co.*, 115 N. E. 640.

Letting to Lowest Bidder—When Inapplicable.

(Wis.) A city charter requirement, that contracts for "work" should be let to the lowest bidder, is inapplicable to a street lighting contract, especially since the rate charged is constantly subject to the Railroad Commission's supervision under Public Utilities Law.—*State v. Oconto Electric Co.*, 161 N. W. 789.

Debt Limiting Municipal Indebtedness.

(Ga.) City of Waycross under new charter (Acts 1909, p. 1456) having made valid assessments against abutting lots for cost of paving street and levied ad valorem tax to cover balance and cost, its contract liability for pavement during current year, did not amount to debt, within Const. art. 7, § 7, par. 1 (Civ. Code 1910, § 6563), limiting municipal indebtedness.—*City of Waycross v. Tomberlin*, 91 S. E. 560.

NEWS OF THE SOCIETIES

Calendar of Meetings.

July 24-27.—DOMINION ASSOCIATION OF FIRE CHIEFS. Annual convention, Port Arthur and Fort William, Ont. Secretary, James Armstrong, Chief, Fire Department, Kingston, Ont.

July 30-Aug. 3.—SOUTHERN SOCIOLOGICAL CONGRESS. Annual meeting, Blue Ridge, N. C. Secretary, J. E. McCulloch, 508 McLachlen Bldg., Washington, D. C.

Aug. 1-3.—AMERICAN SOCIETY OF SANITARY ENGINEERING. Annual meeting, Grand Rapids, Mich. President, William C. Groeninger, Ohio State Board of Health, Columbus, O.

Aug. 6.—PACIFIC COAST ASSOCIATION OF FIRE CHIEFS. Twenty-fifth convention, Anaconda, Mont. Secretary, ex-Chief H. W. Bringham, Seattle, Wash.

Aug. 15-17.—LEAGUE OF WISCONSIN MUNICIPALITIES. Annual convention, Racine, Wis. Secretary, Ford H. MacGregor, Madison, Wis.

Aug. 21-23.—NEW YORK STATE FIREMEN'S CONVENTION, Flushing, N. Y. Secretary, Thos. Honohan, Frankfort, N. Y.

Aug. 22.—UNION OF NEW BRUNSWICK MUNICIPALITIES. Annual convention, St. John, N. B. Secretary, James King Kelley, St. John.

Aug. 27-29.—UNION OF CANADIAN MUNICIPALITIES. Annual convention, London, Ont. Secretary, W. D. Lighthall, K. C., Westmount, Que.

Aug. 29-31.—UNION OF NOVA SCOTIA MUNICIPALITIES. Annual convention, Truro, N. S. Secretary, Arthur Roberts, Bridgewater, N. S.

Aug. 29-31.—ONTARIO MUNICIPAL ASSOCIATION. Annual convention, Toronto, Ont. Secretary, B. H. Spence, 705 Lumsden building, Toronto, Ont.

Sept. 5-8.—LEAGUE OF AMERICAN MUNICIPALITIES. Annual convention, Gary, Ind. Secretary, Robert E. Lee, City Hall, Baltimore, Md.

Sept. 10-15.—NATIONAL EXPOSITION OF SAFETY AND SANITATION. Annual conference, New York, N. Y. Secretary, W. C. Cameron, Continental and Commercial Bank building, Chicago, Ill.

Sept. 11-13.—AMERICAN ASSOCIATION OF PARK SUPERINTENDENTS. Annual convention, St. Louis, Mo. Secretary, Roland W. Cotterill, 533 City Hall, Seattle, Wash.

Sept. 11-14.—NEW ENGLAND WATERWORKS ASSOCIATION. Annual convention, Hartford, Conn. Secretary, Willard Kent, 715 Tremont Temple, Boston, Mass.

Sept. 18-20.—LEAGUE OF VIRGINIA MUNICIPALITIES. Annual convention, Lynchburg, Va. Secretary, L. C. Brinson, Portsmouth, Va.

Sept. 24-26.—LEAGUE OF CALIFORNIA MUNICIPALITIES. Annual convention, Santa Rosa, Cal. Secretary, Wm. J. Locke, Pacific Building, San Francisco, Cal.

Sept. 25-27.—SMOKE PREVENTION ASSOCIATION. Annual convention, Columbus, O. Secretary, Frank A. Chambers, City Hall, Chicago, Ill.

Sept. 27-29.—AMERICAN AND CANADIAN ENGINEERS AND ARCHITECTS OF NORWEGIAN BIRTH OR DESCENT. Informal congress and re-union, Chicago Norske Klub, Chicago, Ill. Chairman, Committee on Arrangements, Joachim G. Glaver, consulting engineer, Chicago, Ill.

Oct. 15-17.—NATIONAL HOUSING ASSOCIATION. Annual conference, Hotel La Salle, Chicago, Ill. Secretary, Lawrence Veiller, 105 East 22d St., New York City.

Oct. 17-18.—LEAGUE OF MINNESOTA MUNICIPALITIES. Fifth annual convention, St. Cloud, Minn. Secretary-treasurer, Richard R. Price, University of Minnesota, Minneapolis.

Oct. 22-24.—AMERICAN CIVIC ASSOCIATION. Annual meeting, St. Louis, Mo. Secretary, Richard B. Watrous, 914 Union Trust building, Washington, D. C.

Nov. 19-24.—CITY MANAGERS' ASSOCIATION. Annual meeting, Detroit, Mich. Secretary, W. L. Miller, City Manager, St. Augustine, Fla.

Nov. 20-23.—PLAYGROUND AND RECREATION ASSOCIATION OF AMERICA. Recreation Congress, Milwaukee, Wis. Secretary, H. S. Braucher, 1 Madison Ave., New York, N. Y.

Nov. 21-24.—NATIONAL MUNICIPAL LEAGUE. Twenty-third annual meeting, Hotel Statler, Detroit, Mich. Secretary, Clinton Rogers Woodruff, 703 North American Bldg., Philadelphia, Pa.

League of American Municipalities.

Members of the League of American Municipalities are being asked by its president, mayor Buehrman, of New Orleans, and its secretary, R. E. Lee, of Baltimore, in regard to omitting the 1917 convention. Such action already has been taken by the American Society of Municipal Improvements, which was to have met at New Orleans in November.

Iowa League of Municipalities.

The 1917 meeting of the Iowa State League of Municipalities will be held in Iowa City in the early part of September.

Empire State Gas and Electric Association.

The second meeting of this association was held at the Iroquois Hotel, Buffalo, N. Y., July 13. The principal subjects discussed were "Power House Organization," "Hours of Labor" and "Wages and Bonuses."

Pennsylvania County Commissioners.

At the annual convention held at Pottsville, the following officers were elected: President, W. D. Reamer, Westmoreland; vice-president, John D. Jenkins, of York; second vice-president, W. C. Kraemer, Erie; secretary, Addison White, Warren; treasurer, William McElwee, Jr., Lawrence. Pittsburgh and Newcastle were candidates for the place of meeting for the next convention. Pittsburgh received 143 votes to 65 for Newcastle.

Indiana Firemen's Association.

Indianapolis was selected as the city in which the first annual convention of the Indiana Firemen's Association will be held, August 3 and 4. This decision was reached at a meeting of the board of directors of the organization, held at Indianapolis recently.

Delegates from all parts of the state will attend the convention which will be held in the Chamber of Commerce building. The association was organized last March, and is represented in twenty-seven cities. Two delegates from each city will attend and many other members of fire departments, including fire chiefs, will be present.

Among the questions to be discussed at the state meeting will be fire prevention, standard equipment and the firemen's pension.

Chicago Cement Machinery and Building Equipment Show.

The first Chicago Cement Machinery and Building Material Show will be held at the Coliseum, opening at eight p. m. Wednesday, Feb. 6th, and closing Feb. 13. This show, held under the management of the National Exhibition Company, will take the place of the annual cement shows which have been held in the Coliseum for the past ten years. The Cement Products Exhibition Company will conduct no cement show in the Coliseum in 1918.

Efforts will be made to bring to Chicago during the period of the show such organizations as the American Concrete Institute, the American Concrete Pipe Association, the National Builders' Supply Association, the Illinois Lumber and Builders' Supply Dealers' Association, the American Association of Engineers, etc.

Prices for space at the coming show are the same as those which prevail at the last cement show. These prices include all necessary booth equipment and are payable in two installments. A new plan of assigning space will be instituted, preference being given to the exhibitors at the tenth show. Adequate space for heavy machinery will be provided.

PERSONALS

Crane, Frank B., has been appointed superintendent of supplies of Boston, Mass.

Dater, Philip H., city engineer of Portland, Ore., has resigned. He will be succeeded by O. Laugaard.

Hartigan, Joseph, commissioner of the bureau of weights and measures, of New York city, has resigned, to take effect on August 1. Mr. Hartigan will resume the practice of law, which he gave up upon his appointment in May-1914.

Moore, William S., city engineer of Grand Rapids, has just been appointed State Highway Engineer of Indiana.

Reimer, A. A., engineer of the East Orange, N. J., water commission, has been dropped by the commission. Mr. Reimer is acting as captain in the Engineers' Reserve Corps and the commission contends that an engineer should be on hand in case of emergency. R. M. Roper, assistant engineer, is acting head of the department.

Schober, F. Carl, city forester of Syracuse, has resigned and will go to Baltimore as forester for that city on August 1.

Stanley, G. C., has been appointed chief of the Norfolk, Va., fire department, to succeed W. L. Sykes.

Steele, A. G., a paymaster in the Pennsylvania highway department, has resigned to take a position with the state treasury.

Winsor, Frank E., has been reappointed chief engineer of the Providence Water Supply Board. His salary will be \$10,000 a year.

NEW APPLIANCES

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations.

PIVOT LOCK MANHOLE COVER.

For Street Sweeping Receptacles and Other Services.

The Ranschousen pivot lock cover, just put out on the market, is designed to fill the need for a more reliable type of manhole cover than is commonly used. The device consists of a locking and operating mechanism which is applicable generally to all street and sidewalk cover plates in service in street, street cleaning, sewer, water and light departments and telephone, telegraph, gas and other public utilities. It is also useful for coal-hole covers. It is designed to eliminate the troublesome features of the ordinary gravity seated covers.

The working parts of the cover are simple, compact and only three in number. They are enclosed in a moisture and dirt-proof housing and packed in grease, thus eliminating difficulties due to rusting, freezing or adhesion. The mechanism is operated by a key wrench having a "T" handle about three feet long. To open, the key is inserted in a slot in the cover near its edge. A counter-clockwise turn of the key wrench releases the lock and raises the cover perpendicularly from its rim for clearance and then rotates or pivots the cover horizontally away from the frame and exposes the opening. To close, a clockwise turn of the key wrench swings the cover back over its seat and automatically lowers and locks it to its seat. It can be so designed that the key wrench may not be removed until the cover is positively seated and locked. The lifting power is applied from the under side of the cover and no ice or rust can resist its application.

The cover is positively locked to its frame when seated; it can not be unseated or tipped by passage of vehicles and it can only be opened by the key wrench in the hands of an authorized person. Carelessness of an operator is safeguarded against by the key wrench being positioned in mechanism until the cover is locked. This safety feature eliminates the frequent liability

of damage suits and makes the cover fool-proof and burglar-proof.

Another important advantage claimed for the cover is economy of time and labor in opening. One person can quickly unlock and operate the device under any condition of weather or temperature.

A particularly important application of the new type of cover, which is interesting street cleaning officials, and which promises a solution to many difficulties, is the use of subsurface receptacles to hold cleaners' cans. This method has recently been favorably considered in the cities of Springfield and Worcester, Mass.

The accompanying illustration shows the device. It is made by the East Iron & Machine Co., Lima, O.

STEEL CASTINGS.

For Heavy Service Made by Special Stroh Hardening Process.

The use of machinery of all kinds in construction work and in utilities plants frequently involves the scraping of parts and even whole machines because of excessive wear on only a very small, though essential, part of the metal. Such is perhaps most often the case with such parts as pinions, gears, wheels and jaw members in crushing machinery. The actual percentage of the weight of a steel casting which is worn away in practice is generally very small. For example, the teeth of the average gear constitute less than ten per cent of the total weight; a worn tooth weighs half as much as a new—and the remainder, or 95 per cent has been used merely for supporting weight or stress and is never worn out. The use of hard material is of no benefit in this greater portion and is nearly always detrimental, both on account of the expense of machinery and the nature of high carbon or high alloy steel.

The solution of this problem is claimed by the Stroh steel hardening process. It puts Stroh alloy, held to be the greatest wear resistant steel known, only on the parts subject to actual abrasion. The easily machined

and cheaper material is used in the other 95%, thus cutting down expense. The Stroh process is a method for casting the finest alloy steel together with ordinary soft steel in one solid piece. The resultant casting has a wear-proof alloy steel stratum upon the wearing surfaces, while the body is composed of any desired steel and is in no way affected. This alloy can neither come loose, nor spall, nor spread and flow. Its depth or thickness, its location and its hardness are completely controlled and are varied according to the size of the piece and nature of service expected.

RANSEHOUSEN
PIVOT LOCK
MANHOLE
COVER.

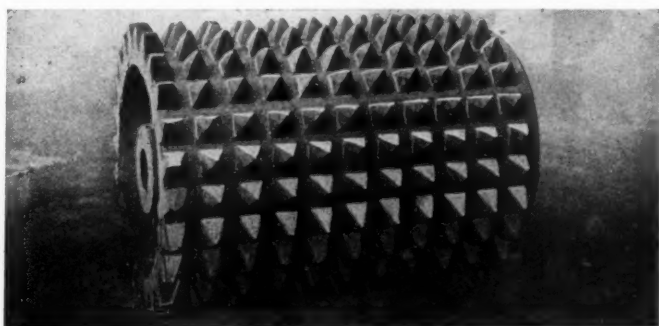


The manufacture of these castings naturally requires careful control and specially skilled labor. These are claimed to be the chief features of the Lawrence and Darlington foundries, where the Stroh process castings are made. The foundries turn out carbon steel, titanium, vanadium, nickel or manganese steel castings. The typical casting generally has a base of ordinary carbon steel, the others being made on specifications.

These castings are widely used in crushing machinery, the Blake jaw crusher, in fact, having been first made at the Lawrence foundry.

One of the accompanying illustrations shows some gyratory crusher heads. Stroh castings are used for heads and plates and have been found very satisfactory. The Stroh steel concave plates do not peel over or flow and bend. Removal or resetting of worn Stroh steel plates is as easy as of iron. The other cut illustrates the use of Stroh steel in slugger roll castings.

Stroh process castings are the products of the foundries of the Stroh Steel Hardening Process Co., First National Bank building, Pittsburgh, Pa.



STROH
STEEL
SLUGGER
ROLL.

INDUSTRIAL NEWS

Cast Iron Pipe.—Prices continue at the record high levels of last week. While private buying continues to a slight extent, municipal business is still withheld. Quotations: Chicago—4-inch, class B and heavier, \$68.50; 6-inch, \$65.50. New York—4-inch, class B and heavier, \$68.50; 6-inch, \$65.50. Birmingham—4-inch, class B and heavier, \$63; 6-inch, \$60; class A, \$1 extra.

The San Francisco office of the **Blaw-Knox Co.**, a consolidation of the Blaw Steel Construction Co. and the Knox Pressed & Welded Steel Co., will be maintained in the Rialto building and in charge of Edward Ornitz.

The Pacific Flush Tank Co., Singer building, New York, and 4241 E. Ravenswood ave., Chicago, has just published a new circular describing the use of sewage ejectors in industrial works. This catalog should prove of decided interest and value at the present time of industrial expansion. The type of ejector described is the "PFT" and its construction and operation are fully explained and clearly illustrated.

War Contracts for Motor Trucks.—The Transportation Division of the War Department announces the letting of contracts for the following motor trucks:

Make	Number of Trucks	Classification
Packard	1,800	B
Locomobile	400	B
Clinton	3,750	B
Pierce Arrow	800	A
Jeffery	3,000	A
Barford	900	A

The plant of the **United States Motor Truck Co.**, at Cincinnati, O., was recently the scene of a meeting of about a hundred manufacturers and dealers in motor trucks in the Cincinnati district at a lecture on truck springs and axles given by J. R. Phillips, service manager of the Sheldon Spring & Axle Co., Wilkes-Barre, Pa. The design and construction of worm drive truck axles and of methods of taking care of them after they have been put into service, were explained. Luncheon was served by the company to its guests. Similar lectures will be given in future.

Preparedness Inventory of Automotive Plants.—A comprehensive industrial inventory of the automotive industries, including automobile, airplane and watercraft factories, to make available to the Government all possible information regarding the manufacturing facilities and the possibilities of expansion for war work, has been inaugurated by the Automotive Committee of the

Council of National Defense. The work will probably require at least three weeks. The committee states that the undertaking was inspired by the approaching great demand on the industries for airplane engines, motor trucks, tractors and motor boats for war purposes.

Proposed Power Plant in Australia.—The city of Melbourne, Australia,

has been discussing the possibility of building a power plant that would utilize pulverized coal or lignite for fuel. It is possible that experts from Australia will visit the United States to investigate plants in use in this country. American firms interested and wishing to keep in touch with this project should correspond directly with the city electrical engineer of Melbourne, Mr. H. R. Harper.

PROBLEMS CITIES ARE STUDYING WITH EXPERTS

SEWERS and a **DISPOSAL PLANT** are to be built by Grand Mound, Ia., from plans worked out by Chas. P. Chase, Clinton, Ia.

Tehamah, Neb., is to build a **BRIDGE** according to plans drawn by A. C. Arend, Brandies building, Omaha, Neb.

In making a number of **SEWER IMPROVEMENTS**, Taylor, Pa., had the engineering services of Harry C. Hall, Mears building, Scranton, Pa.

The city of Bay St. Louis, Mo., has voted \$200,000 for the construction of a reinforced concrete **SEA WALL**. The engineer for the project is D. U. Harris, Mobile, Ala.

Frankfort, N. Y., is to make a number of **PAVING IMPROVEMENTS**. The engineers are Woodward & Symonds, Utica City National Bank building, Utica, N. Y.

A **SEWAGE TREATMENT PLANT** is to be built by Waxahachie, Tex. Plans and specifications were prepared by M. Griffin O'Neil & Sons, consulting engineers, 1505-8 Praetorian building, Dallas, Tex.

The **WATERWORKS** of Liberal, Kans., will be improved according to the plans and specifications being prepared by E. T. Archer & Co., 609 New England building, Kansas City, Mo.

Hamilton County, Columbus, O., is to build a **CONCRETE BRIDGE**. The plans for the structure were prepared by W. J. Watson Engineering Co., 1150 Leader building, Cleveland, O.

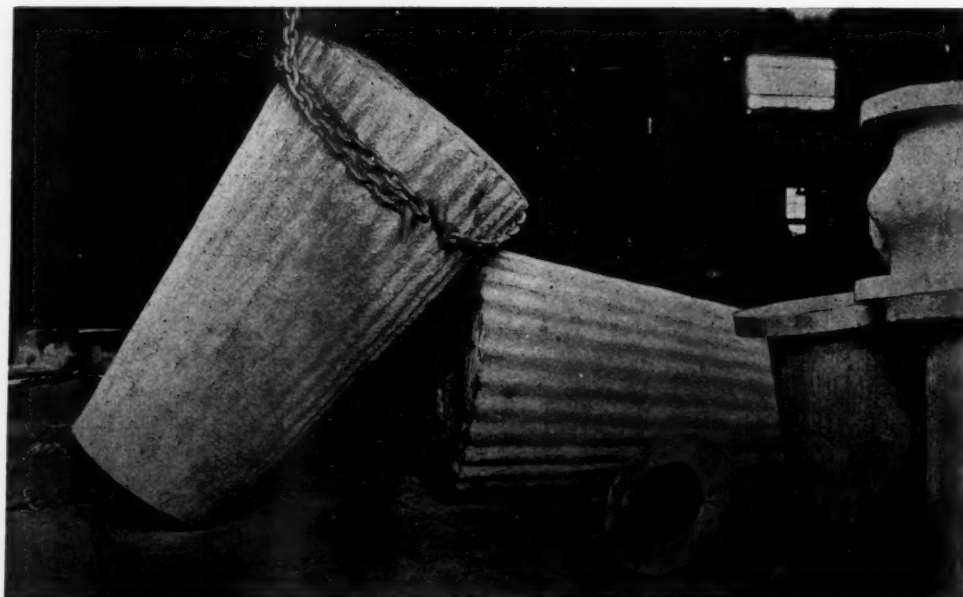
Eufaula, Okla., is to make **STREET IMPROVEMENTS**. The plans and specifications were prepared by the Hughes Engineering Co., 304 Bank of Commerce building, Tulsa, Okla.

PAVING IMPROVEMENTS are to be made by Boyd County, Catlettsburg, Ky., plans having been completed by F. W. Gesling, Ashland, Ky.

SEWERAGE and **PAVING IMPROVEMENTS** are to be made by McKeesport, Pa. The engineer to prepare plans and specifications is Cyrus E. Miller, 5135 Jenkins Arcade, Pittsburgh, Pa.

An **ELECTRIC LIGHT PLANT** and **SEWERS** are being considered by Sentinel, Okla. The engineers are W. B. Rollins & Co., 209 Railway Exchange Building, Kansas City, Mo.

The Green Bay Levee & Drainage District No. 2, Fort Madison, Ia., is to build a **PUMPING STATION**. Plans and specifications were prepared by the Edmund T. Perkins Engineering Co., 1210 First National Bank building, Chicago, Ill.



STROH STEEL GYRATORY CRUSHER HEADS.